UNIVERSIDAD PARA LA COOPERACION INTERNACIONAL
(UCI)

PROJECT MANAGEMENT PLAN FOR THE GIS MAPPING OF EBONY PARK AGRO PARK

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DEDICATION

This body of work is dedicated to my four children: Shomari, Jaden, Jonathan and Amory. You all give me the strength to be my best.

ACKNOWLEDGMENTS

I am truly thankful for the assistance rendered to me by the entire staff of ACP especially Ms. Petronia Colley and Loron Pinnock Brown.

To my Tutor Mr. Johan Aleman Rojas and my Lecturer Carlos Brenes; thanks for your invaluable contributions to the development of this study. It has really given me a more comprehensive understanding of Project Management in a practical way.

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My Lord and Saviour, you are never least. I am filled with gratitude because you are who brought me through.

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ABBREVIATIONS AND ACRONYMS

- Agriculture Competitiveness Programme (ACP)
- Agro-Invest Corporation (AIC)
- Chief Financial Officer (CFO)
- Enterprise Environmental Factors (EEF)
- Final Graduation Project (FGP)
- GIS Mapping of Ebony Park Agro-Park (GISMEPA)
- Inter-American Development Bank (IDB)
- Ministry of Industry Commerce Agriculture and Fisheries (MICAF)
- National Irrigation Commission (NIC)
- National Land Agency (NLA)
- Organizational Process Assets (OPA)
- Project Management Institute (PMI)
- Project Management Co-ordination Unit (PMCU)
- Universidad Para La Cooperacion Internacional (UCI)
- Work Breakdown Structure (WBS)

EXECUTIVE SUMMARY (ABSTRACT)

MICAF and by extension the Agricultural competitiveness Programme (ACP), formerly Rural Agricultural Competitiveness Programme was given funding in 2010 by the Inter-America Development Bank, IDB, to launch a programme to improve the competitiveness of Jamaica's agricultural sector. Food safety and quality management systems implementation is just one of the projects in this programme geared towards achieving competitiveness by increasing the capacity of small and medium size famers to access national and international markets, increase the performance of the country's food safety and quality management systems and foster the development of agricultural and agro-processing value chains.

The project had an issue date of January 2013 and project close out was set for December 31, 2016. The new project close out date was set for March 31, 2018 with auditing of the Agro-Parks scheduled for October 2017. The project was behind schedule and the GIS mapping phase was not a part of the original plan and so was not included as a requirement. This phase of mapping has to be completed on time and within budget to move to auditing. This required the development of a systematic documented framework of principles, steps and procedures to mitigate against risks that would contribute to not completing this critical phase and by extension; the project in the stipulated time.

The development of the Project Management Plan to map the Ebony Park Agro Park provided a framework for the use of documented best practices contained in five subsidiary plans in which to work and bring in this phase of the project on time. The development of a Project Management Plan also provided a template within the ACP and by extension, the Project Management Co-ordination Unit of MICAF for the planning of future similar projects or phases of projects. This fostered a thrust in a positive direction to formalize MICAF's Organizational Project Management Maturity Model.

The general objective of this project was to create a Project Management Plan for the GIS mapping of the Ebony Park Agro Park (GISMEPA) Project in Clarendon, Jamaica to provide a logical and sequential way to plan for similar projects in the future.

There were six specific objectives. The first two were to create a Project Charter to get official authorization for project start and to develop a Scope Management Plan to include all the work included in the project. Creation of a Schedule Management Plan to document the activities, their attributes and relationship in the timely completion of the project and a Cost Management Plan to provide the policies and procedures required to plan and manage the expending of resources needed for the project were specific objectives three and four. Specific objectives five and six were to develop a Quality Management Plan to identify and define the quality requirements of the project and service and meet organizational quality policy and to develop a Risk Management Plan to document the

categorization of identified risks, responsible risk owners, possible response to them and how to monitor and control risks.

The methodology employed for this study was to use descriptive and analytical approaches supported by primary and secondary information sources. The descriptive and analytical methods involved the use of data from interviews, observations, document review, oral histories, advertisement, reports and organization process assets as well as the guide set out in the standard PMBOK® Guide – Fifth Edition. The use of pamphlets, textbooks, scholarly articles reviews, journal articles review and other reference books assisted in creating the Project Charter and the five subsidiary plans to achieve the specific objectives and ultimately the general objective.

Description of MICAF's organizational needs and the business case in details provided not only a background for the project but also presented inputs to the development of the project. MICAF's, and by extension, ACP's Organizational Process Assets garnered from procedures, policy documents, reports and interviews were analyzed using the guide set out by the PMBOK® Guide – Fifth Edition to create the Project Charter and the five subsidiary plans.

One noted conclusion was that the creation of a Project Charter with high-level definitions, requirements, budget, a named Project Manager and Sponsor not only gave a description of the project but also laid out a broad framework from which to work. Most importantly, it contained the official authorization for project start and the application of resources to project activities.

Recommendations for this study included the need for MICAF to establish a formalized project management policy as that Ministry from time to time oversaw projects funded by donor agencies such as IDB. Funding agencies were encouraged to equip project oversight departments with a framework to streamline project governance. This would empower the Director (or Programme Manager with sufficient decision-making power, within protocol, to reduce the turn-around time for decisions and by extension reduce the risk of having delays.

The need for IDB to collaborate with MICAF, to provide formal training in Project Management especially to members of the Project Co-ordination unit of MICAF and those persons who are responsible for steering projects from the Ministry was recommended. Recommended also was that ACP develop, at minimum, a Project Charter for each project they oversee especially if the Sponsor does not present one and ensure that all requirements for a project or a phase be thoroughly researched to prevent or reduce scope creep, delays and cost overruns.

1. INTRODUCTION

The Ministry of Industry Commerce Agriculture and Fisheries (MICAF) is the arm of the Jamaican Government that has responsibility for agriculture. This responsibility ranges from policy development and research to programme implementation. MICAF is a functional organization with a Project Management Co-ordination Unit headed by a director. This unit is responsible for oversight of many projects in the Ministry. These projects are generally funded by international funding agencies but are geared toward achieving the mission of MICAF.

GlobalGAP Standard implementation and certification are two spokes in the wheel of the competitiveness programme of MICAF. This is a milestone phase in component two of a food safety and quality management project involving installation of food safety facilities, training and auditing of the system by International auditors. The auditors require sufficient digital information on the location of this infrastructure and the farmer plots on which they are located and thereby giving rise to the need for Geographical Information System (GIS) mapping.

GlobalGAP implementation and certification is just one of the projects being implemented by MICAF .The project management co-ordination unit in the Ministry has oversight and implementation is being undertaken by the Agricultural Competitiveness Programme, (ACP).

1.1 Background

MICAF and by extension the Agricultural competitiveness Programme (ACP), formerly Rural Agricultural Competitiveness Programme was given funding in 2010 by the Inter-America Development Bank, IDB, to launch a programme to improve the competitiveness of Jamaica's agricultural sector. Improving infrastructure and developing food safety and quality management systems to be able to access international, regional and national markets is just one of the projects in this programme geared towards achieving competitiveness. The

general objective of the ACP is to contribute to the competitiveness of the agricultural sector in Jamaica through the achievement of three specific objectives: (i) increase the capacity of small and medium size famers to access national and international markets; (ii) increase the performance of the country's food safety and quality management systems; and (iii) foster the development of agricultural and agro-processing value chains. This programme consists of three components. Component one : Development of Farm-To-Market Linkages, Component two: Food Safety and Quality Management Systems and Component three: Agribusiness Value Chain Development.

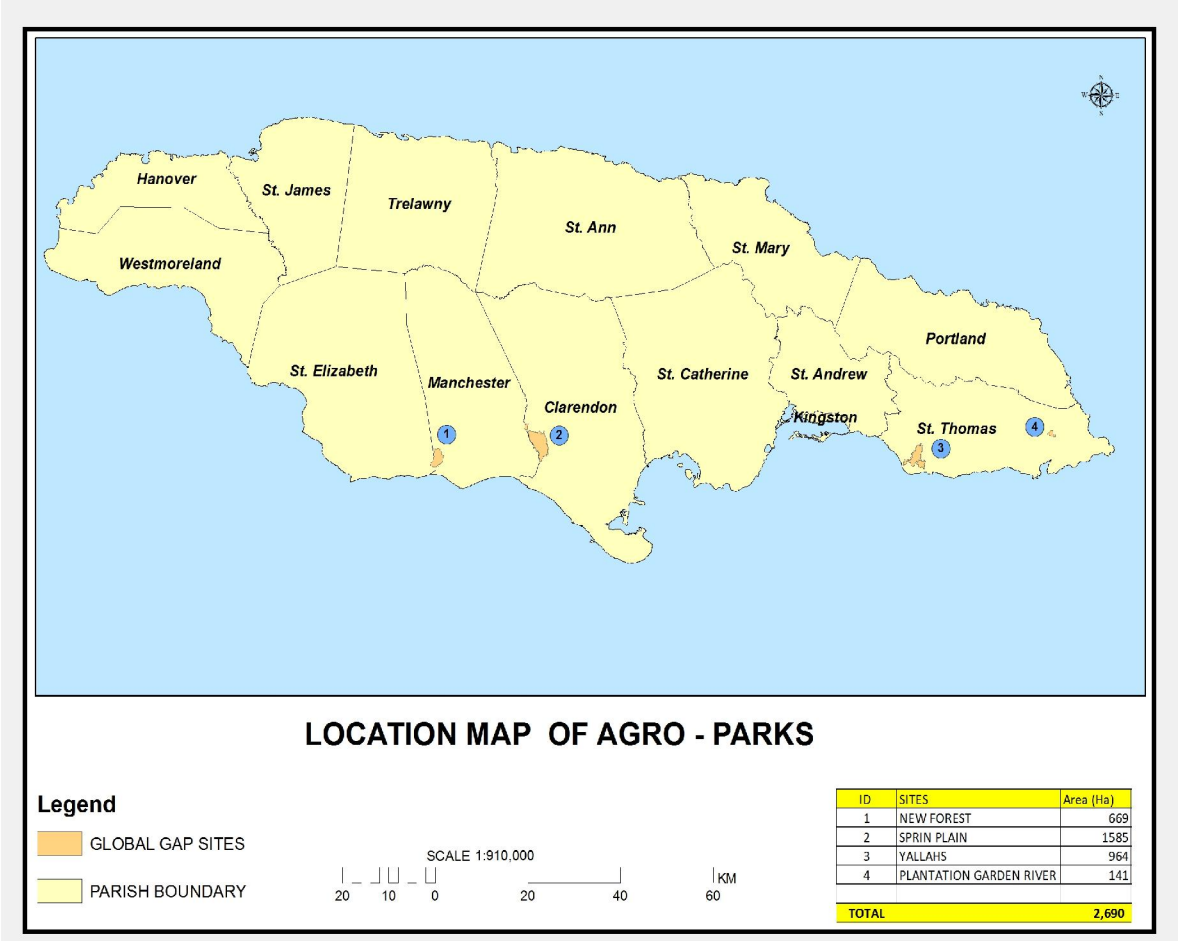

Figure 1. Location Map of Agro Parks. (Source: NIC, 2017).

Component one aims to improve and strenghten the management and organiizational capacities of small farmers so that they are able to access national and international markets. The two sub-componenents are:

a) Strengthenming the capacity of Producer Organization (PO)

The objective of this sub-components is to enable POs to manage sustainable and competitiveness agricultural enterprises thereby benefitting from increased income through growth in sales and increased profits.

b) Market access and market linkage development

The objective of this sub-component is to develop market linkages between producers, traders, agro processors, the hospitality industry and other stakeholders in the value chain. This sub-component also addresses the training and dissemination of information needed to meet the more stringent requirements of export markets for non-traditional goods.

Component two seeks to establish an Agricultural Health and Food Safety (AHFS) Management System that will contribute to improving the competiveness of agricultural sector and the health status of the population. The component builds on the progress made by Jamaica under the Agricultural Support Services Project (ASSP) to develop an integrated system supported by a National Food Safety Policy and related legislation. The three sub-componenets are : food safety,plant health and animal health.

Each sub-component focuses on : building institutional and operational capacities at parish and national levels, modernizing inspection, registration, certification and quarantine systems and processes, improving diagnostic surveillance and emergency response capacities, improving public/private sector interactions and implementing activities to safeguard market access for Jamaica's food products.

This will create an integrated, efficient and sustainable AHFS with active stakeholder participation and can respond to changes in international standards and market requirements.

Component three promotes the the integration of of stakeholders into value chain and seeks to encourage greater levels of private investment in the agriculture sector. The strategy is to initiate five pilots of end-end value chains that have the potential to make an important difference in the food production and marketing process of agribusiness value chain through a competitiveness analysis of Jamaica's agriculture sector. These objectives will be achieved by assessing non-traditional agribusiness sub-sectors to facilitate the selection and development of competitive agribusiness value chains, implementing private/public partnership value chain projects and institutional strenghtening of Agro Investment Corporation, AIC.

A phase that is required in the food safety and quality managemnet systems project is GIS mapping. This phase is critical and has to be done before auditing of the agro parks can be undertaken. The project is aiming to certify four agro parks in Ebony Park, Clarendon New Forest Duff House in St. Elizabeth and the Yallahs and Plantain Gardens River agro parks both in St. Thomas (see Figure 1). This final graduation project is geared towards preparing a project managemnet plan for the GIS mapping of the Ebony Park Agro Park. This will provide a complete guide for the process as well as a template for future projects that may be simiar to this one.

The ACP, under the umbrella of the Project Management Co-ordinationUnit (PMCU) of MICAFoperates in a project environment. However, the project management maturity and capability of the entity has not shown to be at the required level to successfully manage projects on its own.Therefore, all project directives are guided and approved by the IDB and oversight is done by the PMCU of MICAF. This function of the project management co-ordination unit is not considered a project management office (PMO) as this department is still overseeing other functional activities.

1.2 Statement of the problem

The Agricultural Competiveness Programme(ACP), though the current

organization overseeing the project to implement the GlobalGAP standard in the Agro Parks is not at a mature level in handling projects and so does not operate within its own project management framework. This current project had an issue date of January 2013 and project close out was set for December 31, 2016. The new project close out date is March 31, 2018 with auditing of the Agro-Parks scheduled for October 2017. At this stage,the project is behind schedule and the GIS mapping phase was not a part of the original plan and so was not included as a requirement. This phase of mapping must be completed on time and within budget to move to auditing. This requires the development of a systematic documented framework of principles, steps and procedures to mitigate against risks that will contribute to not completing this critical phase and by extension; the project in the stipulated time.

1.3 Purpose

The development of the Project Management Plan is to map the Ebony Park Agro Park will provide a framework for the use of documented best practices contained in five subsidiary plans. These five subsidiary plans will be broken down into work packages where resources can be applied. The documentation of what needs to be done, when, by who and the money needed would provide the framework in which to work to achieve success and bring in this phase of the project on time. The development of a the Project Management Plan will also provide a template within the ACP and by extension the project management unit of MICAFfor the planning of future similar projects or phases of projects. This could foster a thrust in a positive direction to formalize MICAF's organizational project management maturity model.

1.4 General Objective

The general objective of this project is:

To create a Project Management Plan for the GIS mapping of the Ebony Park Agro Park (GISMEPA) Project in Clarendon, Jamaica to provide a logical and sequential way to plan for similar projects in the future.

1.5 Specific Objectives

The specific objectives are:

1. To create a Project Charter to get official authorization for project start.
2. To develop a Scope Management Plan to include all the work that is to be done.
3. To create a Schedule Management Plan to document the activities, their attributes and relationship in the timely completion of the project.
4. To develop a Cost Management plan to provide the policies and procedures required to plan and manage the expending of resources needed for the project.
5. To develop a Quality Management Plan to identify define the quality requirements of the project and service and meet organizational quality policy.
6. To develop a Risk Management Plan to document the categorization of identified risks, responsible risk owners, possible response to them and how to monitor and control risks.

2. THEORETICAL FRAMEWORK

According to Rondinelli, 1976 “Projects are the basic building blocks of development. Without successful project identification, preparation and implementation, development plans are no more than wishes.” Projects translate plans into action. This begs the question: are project (work) plans and Project Management Plans the same?

Project vs. Project Management Plan

According to Fahad Usmani 2013, “the project plan is a formal approved document used to broadly guide the project, and facilitate communication among the stakeholders. The project plan takes its objective from the project charter and the scope statement.” This translates into high- level plans and answers why the project is being done, what are the must- have deliverables and what value will the outputs add to the organization. There are, however, differences between the project plan and the Project Management Plan.

The Project Management Plan, also a formally approved document, presents a very precise way of how the project team is going to apply resources to tasks to get the required product or service; a systematic plan from start to finish including monitoring and control. A Guide to the Project Management Body of Knowledge (PMBOK® Guide) - Fifth Edition, Project Management Institute (PMI) ®, Inc., 2013 also defines Develop Project Management Plan as “the process of documenting the actions necessary to define, prepare, integrate, and co-ordinate all subsidiary plans”.

Subsidiary plans that make up the Project Management Plan cover the 10 knowledge areas. These plans include Integration Management Plan, Scope Management Plan, Cost Management Plan, Schedule management Plan, Quality Management Plan, Risk Management Plan, Human Resources m\Management

Plan, Communication Management Plan, Procurement Management Plan and Stakeholder Management Plan.

Figure 2. 10 Project Management Knowledge Areas. from A Guide to the Project Management Body of Knowledge (p. 66), Project Management Institute, 2013, Project Management Institute. Copyright 2013 by Project Management Institute, Inc.)

These subsidiary plans are developed from the ten knowledge areas shown in Figure 2. This shows nine of the subsidiary plans feeding into the tenth, integration management that dictates that during the project there is ongoing coordination of inputs to achieve the product or service. This concept is known as progressive elaboration. As more information becomes available, broad and higher level plans become more refined as the project progresses.

Benefits of project planning

An hour spent in planning a project can save three during execution; it saves crucial execution time. The Project Management Plan defines the project in detail. It provides a platform for the establishment of the project boundaries, scope and deliverables. The project management team and the project stakeholders are identified and their needs and how they are engaged are established in the stakeholder management plan. The plan indicates the project schedule and major milestones. The plan also establishes baseline plan for

schedule, scope and cost and provides a tracking mechanism against an established baseline. The Project Management Plan is also very helpful in project performance reporting.

Risk identification is very critical to the success of any project and the risk management plan indicates categorization of the identified risks and a response mechanism to mitigate against these risks. The Project Management Plan also establishes a process for implementing changes to project scope, schedule cost, quality and risk. This is imperative as any changes in these baselines could result in project delay or failure.

Various criteria that the product or service should meet in order to fulfil the project objectives are listed in the requirements document; an output of the collect requirements process under the scope management knowledge area. Importantly, the plan identifies existing resources and indicates additional requirements that may be needed to complete the project.

Leaving out critical elements of the plan

Mochal, (2003) suggests that poor up-front definition and planning are direct factors for project stalling and failure as a result of lack of business support, poor scope control and poor estimates. There should be detailed definitions of the project objectives, scope, assumptions, risks, budget, timeline, organization, and overall approach. This is very important in establishing consensus among all project stakeholders. This way all ideas and opinions can be presented and taken into account. The total Project Management Plan should be developed before the project work begins. This allows for the allocation of resources correctly mapped to the work packages

2.1 Company/Enterprise Framework

MICAF is a functional organization. It is a Government Ministry and so its primary

business is to fulfil mandatory policies set out by Central Government. The functional nature of the organization makes it a weak matrix organization. The functional managers are the ones in charge and so the ACP Programme Manager is not autonomous in decision-making.

The core function of the organization is not Project Management and so resource allocation to project is very limited. Several team members on The ACP are recruited from outside the organization and many tasks such as infrastructural development are contracted out. The sponsor for the programme is the IDB, funds are channeled through the Ministry's Accounts Department, and this requires sign off by the functional manger in this case, the Permanent Secretary.

2.1.1 Company/Enterprise Background

The ACP, an arm of the MICAF was born out of the ASSP project when in 2010 IDB provided funding to improve Jamaica's competitiveness in the agricultural sector. The entity operates within the framework of the MICAF organizational structure. Though the ACP primary tasks are project related, the level of project management responsibilities levied on the entity is limited because the project management capabilities of the parent organization are relied upon. The ACP had an issue date of January 2013 and a new closeout date of March 2018.

2.1.2 Mission and Vision Statements

The vision and mission statements of MICAF are:

Vision

The Ministry of Agriculture and Fisheries will be the driver for the sustainable development of the Jamaican agricultural sector and natural resources by the year 2020.

Mission

To advance the development of a modern, efficient and internationally competitive agricultural sector and the sustainable management of our fishery

resources, in order to promote food security and food safety, in an effort to contribute to the development and well-being of our people.

The vision and mission statements of an organization provide a launching pad from which goals can be set. These goals will ultimately dictate the organizational strategies needed to propel the entity. The implementation of a food safety and quality management system through GlobalGAP certification definite would steer MICAF on the path to sustainability and international competiveness thereby accomplishing the mission.

2.1.3 Organizational Structure

Figure 3 depicts the organizational structure of MICAF. Though a formal organizational structure exist in MICAF there needs to be a description of the framework under which the food safety and quality management project operates. The Minister has overall responsibility for the departments in MICAF. The Permanent Secretary deputizes him. All heads of department reports to him and so the Programme Manager for the ACP has a direct reporting relationship with the Permanent Secretary. The Director of the Project Management Co-ordination unit in project delivery also supports the Programme Manager.

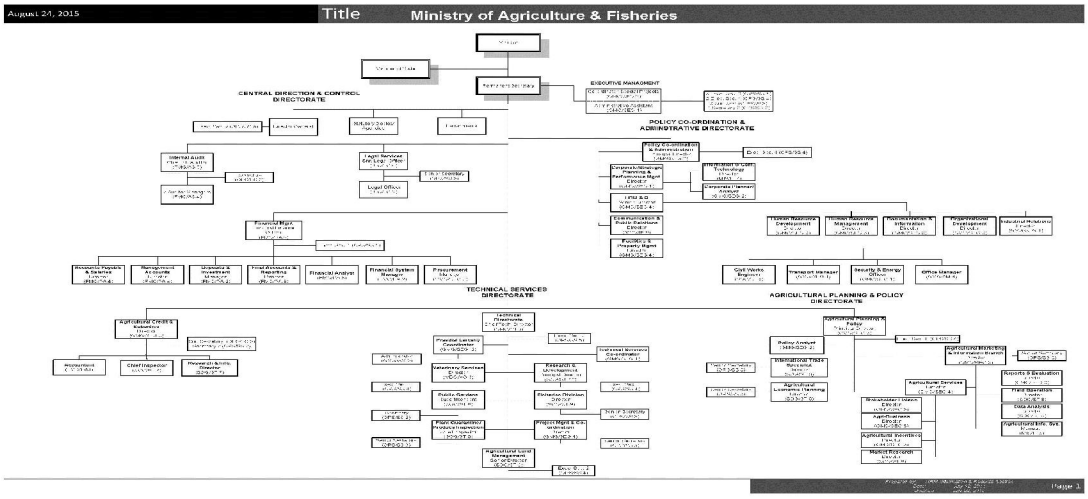

Figure 3.MICAF Organizational Structure (Source: Human Resource Management Information and Resource Section, MICAF, 2013).

2.1.4 Products Offered

MICAF is mandated to oversee the agricultural sector and provide policies, infrastructure, technical support, access to markets (local regional and international) and financial guidance and assistance for small, medium and large farmers. This will lead to a decrease in the importation bill for agricultural produce, which would improve the economy in the short, medium and long term. GlobalGAP implementation and ultimately certification will provide access to local but especially international markets. However, this is predicated on the successful completion of all phases and ultimately the project itself.

2.2 Project Management Concepts

Picariello (2014) in his article "*The benefits of project management*" presented these broad headings as the benefits organizations stand to gain from project management.

1. *Better Efficiency in Delivering Services*:

   Having a plan presents a checklist that would take the project from start to finish and a way to mitigate against any eventualities thereby completing the project within time and budget.

2. *Improved / Increased / Enhanced Customer Satisfaction*:

   Simply put project management can lend to satisfied customers who will keep coming back because the organization has presented a method to them that works.

3. *Enhanced Effectiveness in Delivering Services*:

   The organization now has a framework and a system that has been validated so its application guarantees similar results.

4. *Improved Growth and Development Within your Team*:

   Promotes a sense of responsibility to the process as team members are inspired through team building exercise and a sense of belonging and ownership is encouraged.

5. *Greater Standing and Competitive Edge*:

Word of mouth advertising of superior performance cements the organization in the marketplace.

6. *Opportunities to expand services*:

An avenue is created for more business opportunities to expand and further succeed.

7. Better Flexibility:

Project management flexibility allows strategies to be mapped and taken to complete the project. Flexibility also allows for the integration of newer and more dynamic ways to strategize.

8. *Increased Risk Assessment*:

Risk identification, impact and response may present a "red flag" at the right time.

9. *Increase in Quality*:

Quality translates into enhanced effectiveness.

10. Increase in Quantity:

An increase in quantity means an increase in the bottom line. That is the be-all-end-all of any business or at minimum a return on investment.

2.2.1 Project

A project is defined as a temporary endeavour undertaken to create a unique product, service or result. (PMI, 2013). Temporary here suggests that a project is not perpetual and therefore, has definite start and end dates. Projects are developed to add value to an organization either through a value-added product or service. The uniqueness of the product or service is so because all the inputs were undertaken to produce that defined and specific product or service.

2.2.1.1Project Management

Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements, (PMI, 2013). These

requirements are the reason for the project in the first place and a systematic approach to achieving them increases the likelihood of success.

The approved Project Management Plan developed in this study will be used to guide and manage the GISMEPA Project.

2.2.1.2 Project Life Cycle

The project life cycle according to the PMBOK Fifth edition is a collection of generally sequential and sometimes overlapping project phases whose name and number are determined by the management and control needs of the organization or the organizations involved in the project, the nature of the project itself and its area of application. Despite the specific work that may be involved in a project, the organization's project life cycle can provide a framework for project management.

All project no matter the size, follow a certain pattern: project start, defining, organizing and preparing, execution and closeout.

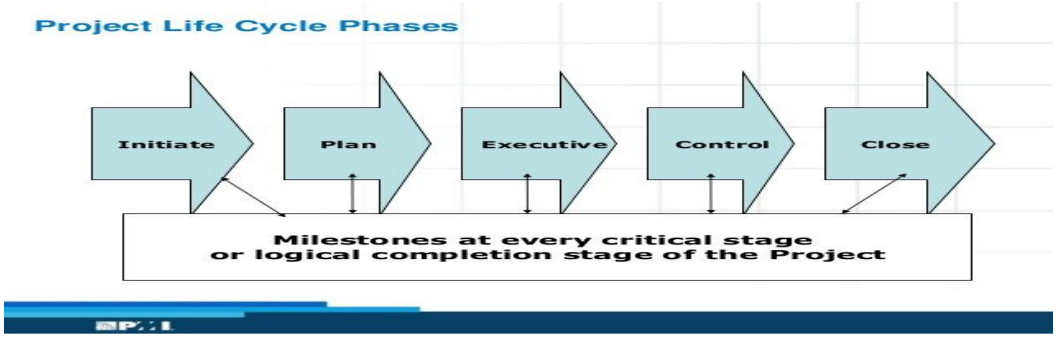

Figure 4. Project Life Cycle From A Guide to the Project Management Body of Knowledge , Project Management Institute, 2013, Project Management Institute. Copyright 2013 by Project Management Institute, Inc.),

This happens during five processes initiating, planning, execution, monitoring and control and closing. These processes are employed either over the entire project or during a phase of the project (Figure 4). MICAF adopts the project life cycle developed by the respective project funding agencies.

2.2.1.3 Project Management Processes

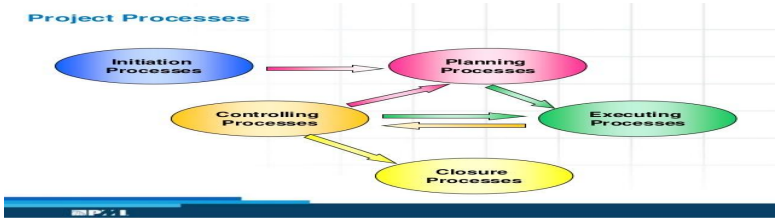

Figure 5. Project Management Processes, (A Guide to the Project Management Body of Knowledge, Project Management Institute, 2013, Project Management Institute. Copyright 2013 by Project Management Institute, Inc.).

Figure 5 depicts the project management processes. The initiation of the project is where official approval of the project is sought and could stem from a business need. A Project Manager is assigned and a charter is created, The planning process is done to incorporate all the work to be done, all the resources needed how the efforts will be managed and controlled and how the product or service will be handed over. The execution process dictates how the work is done. The monitoring and controlling process of the project management processes is built in the Project Management Plan from the planning phase and continues until project closeout. This is integral to the change control management (see section 2.5). The closing process gives detail about the official handing over of the project deliverables and the documentation of lessons learned.

Figure 6 below shows that these processes more often than not overlap especially if there are several phases or interrelated projects in progress at the same time.

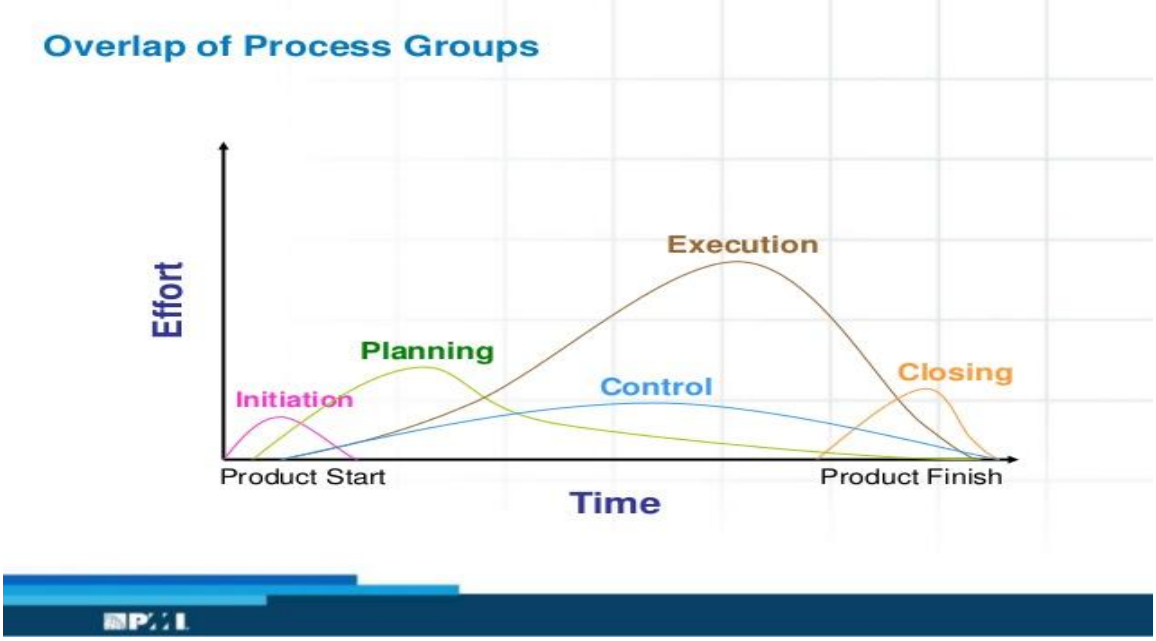

Figure 6. Overlap of project management processes (A Guide to the Project Management Body of Knowledge, Project Management Institute, 2013, Project Management Institute. Copyright 2013 by Project Management Institute, Inc.).

2.2.1.4 Project Management Knowledge Areas

There are ten project management knowledge areas. In the order that they appear in the PMBOK® Guide they are:

Project Integration Management

"Project Integration Management includes the processes and activities to identify, define, combine, unify, and coordinate the various processes and project management activities within the Project Management Process Groups" (Project Management Institute, 2013, p. 63). The processes involved in project integration are:

- Develop project charter (only used for planning and official authorization for project start).
- Develop Project Management Plan (Will be the guide for the project)
- Direct and manage project work
- Monitor and control project work
- Perform integrated change control

- Close project or phase

Project Scope Management

Project Scope Management as defined by PMI, 2013 “includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully” (Project Management Institute, 2013). These processes are:

- Plan scope management (only used in planning)
- Collect requirements (only used in planning)
- Define scope (only used in planning)
- Create WBS (only used in planning)
- Validate scope
- Control scope

Project Schedule (Time) Management

“Project Time Management includes the processes required to manage the timely completion of the project (Project Management Institute, 2013, p. 141). These processes are:

- Plan schedule management (only used in planning)
- Define activities (only used in planning)
- Sequence activities (only used in planning)
- Estimate activity resources (only used in planning)
- Estimate activity duration (only used in planning)
- Develop the schedule (only used in planning)
- Control the schedule

Project Cost Management

“Project Cost Management includes the processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs so that

the project can be completed within the approved budget" (Project Management Institute, 2013, p. 193). These processes are:

- Plan cost management (only used in planning)
- Estimate costs (only used in planning)
- Determine the budget (only used in panning)
- Control costs

Project Quality Management

"Project Quality Management includes the processes and activities of the performing organization that determines quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken." (Project Management Institute, 2013, p. 227). The processes involved in this knowledge area are:

- Pan quality management (only used in planning)
- Perform quality assurance
- Control quality

Project Human Resource Management

"Project Human Resource Management includes the processes that organize, manage, and lead the project team." (Project Management Institute, 2013, p. 255). These processes are:

- Plan human resources management (only used in planning)
- Acquire project team
- Develop project team
- Manage project team

Project Communications Management

Project Communications Management includes the processes that are required to ensure a timely and appropriate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring, and the ultimate disposition

of project information" (Project Management Institute, 2013. The processes in project communication management are:

- Plan communication management (only used in planning)
- Manage communications
- Control communications

Project Risk Management

According to PMI, "Project Risk Management includes the processes of conducting risk management planning, identification, analysis, response planning, and controlling risk on a project" (Project Management Institute, 2013, p. 309). . The processes for project risk management are:

- Plan risk management (only used in planning)
- Identify risks (used in planning)
- Perform qualitative risk analysis (only used in planning)
- Perform quantitative risk management
- Plan risk responses (used in panning)
- Control risks

Project Procurement Management

"Project Procurement Management includes the processes necessary to purchase or acquire products, services, or results needed from outside the project team" (Project Management Institute, 2013, p. 355).

Procurement Management Processes:

- Plan procurement management (Only process involved in the planning process to develop the Project Management Plan)
- Conduct procurements
- Control procurements
- Close procurements

Project Stakeholder Management.

(Project Management Institute, A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition, Project Management Institute Inc., 2013, Page 61).

Each area represents a complete area of specialization including, tools, concepts and tasks that have to be known to be able to successfully manage a project. There are 47 processes associated with these ten knowledge areas. The project that is being managed will determine the areas to know; but predominantly all the knowledge areas are needed whether the project is small and simple or highly complex. Figure 7 shows the interactive relationship between these knowledge areas and their impact on the enterprise.

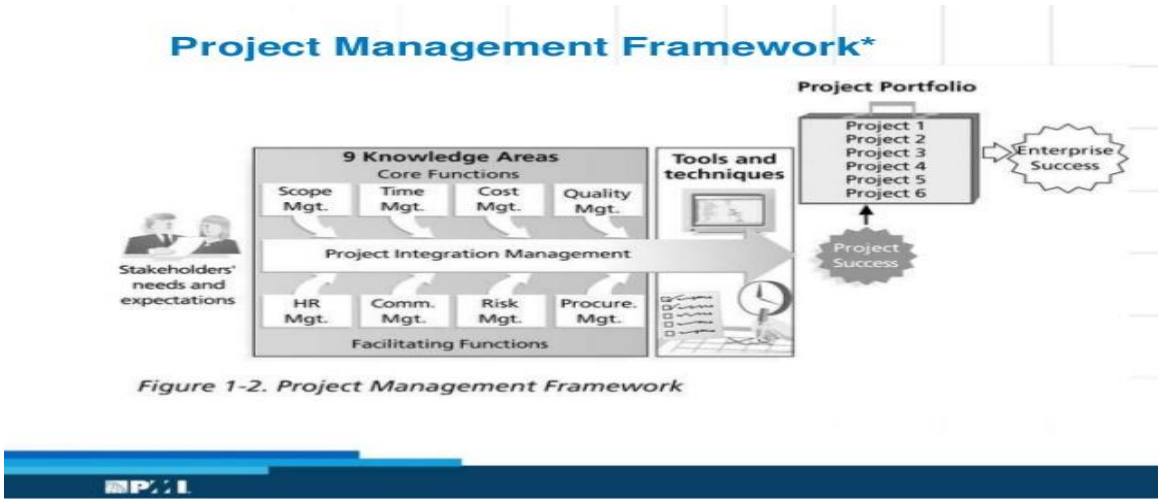

Figure 7. Project Management Framework, (A Guide to the Project Management Body of Knowledge, Project Management Institute, 2013, Project Management Institute. Copyright 2013 by Project Management Institute, Inc.).

2.2.1.5 Programme Management

The PMBOK Fifth edition defines programme management as the centralized coordinated management of a programme to achieve the programme's strategic objectives and benefits. The current food safety and quality management project is one of the many projects being undertaken ACP programme. This involves

resolving resources constraints that may affect multiple projects within the programme, aligning organizational/strategic direction that may affect project and programme goals and resolving issues and change management within a shared governance structure.

2.3 Constraints

BusinessDictionary.com defines a constraint as “an element, factor, or subsystem that works as a bottleneck. It restricts an entity, project, or system (such as a manufacturing or decision making process) from achieving its potential (or higher level of output) with reference to its goal.” In a project context, a constraint is a limitation that will affect the project. Constraints can be in the area of time, cost, risk, scope, quality, resources, customer satisfaction and others and can help to evaluate competing demands. The management sets the priority of each constraint. A change to one constraint can have an impact on other constraints of the project. A project inevitably goes through many changes due to the competing demands. However, each change request should go through a change request process. A project manager has to then evaluate these changes and identify the impact on all the constraints of the project through integrated change control process.

2.4 OPM3

Project Management Institute’s (PMI) organizational project management maturity model is termed as OPM3. This model was designed to help organizations determine their level of maturity in project management. This determination levels the organization continuous improvement process with its organizational strategies. MICAF has not instituted its OPM3 and though it currently manages several projects there is no final determination of its level of maturity in project management.

2.5 Change Control Management

Change control management is defined as the process of establishing a defined

identification of, a thorough documentation of, submission of a formal approval or rejection of, and asserting control of all changes that are going to take place to the project baselines. A well defined and adhered to change control process serves multiple purposes within the planning, execution, and finalization of a project. It helps to assure that all changes that do take place have been thoroughly vetted by the project team and project team leader. Secondarily, it allows for all changes to be carefully and meticulously tracked which allows for fewer surprises along the way, and more accountability at if and when any aspect of the project (whether it be the process or the final deliverables) are called into question. Lastly, a change control can provide financial benefit such that it assures that changes that take place are not arbitrary in nature and rather, have been carefully considered by the team.

Changes in cost, schedule and quality represent risks and could result in project failure. Cost, scope, schedule and quality guidelines are set out in the Project Management Plan and requires official approval for any changes to these guidelines. The current change control procedure of the GlobalGAP project is escalated to the IDB for what is called a “no objection”. This process results in a decisions being forwarded to the project management co-ordination unit and eventually to the ACP programmemanager.

2.6. Organizational Process Asset (OPA)

Organization process assets as defined by PMI, (2013) are “any or all process assets from any or all of the organizations involved in the project that can be used to influence the project’s success. These process assets include formal and informal plans, policies, procedures and guidelines.”

As explained before, the ACP is an arm of MICAF and so policies, procedures and guidelines for the food safety and quality management projecct are adopted from the parent company. The fumding agency, IDB, provide templates to the ACP.

2.7. Enterprise Environmental Factor (EEF)

Enterprise environmental factors are “internal and external environmental factors that surround or influence a project’s success”, (PMI, 2013). The ACP is housed in MICAF and so is directly affected internally. The infrastructure and management, thereof, is the direct responsibility of the Ministry. The programme is also directly influenced by MICAF’s culture, structure and processes.

Politics is a factor that can impact the ACP. The possibility of a change in Government can be a reality every five years when Jamaicans go to the polls. This could affect the ACP in that the mandate of the Government of the day could change or all together close the project.

The advent of the food safety and quality management project was born out of the need for Jamaica to adopt internarional food safety standards(in this instance GlobalGAP) to access local, regional and international markets.

3. METHODOLOGICAL FRAMEWORK

3.1 Information Sources

Information sources, according to Price (1966) are “any system producing information or containing information intended for transmission;” The differentiation between information sources according to Price (1966), depended on its form of representation. There are essentially three categories of information sources. These are primary, secondary and tertiary. Primary and secondary sources will be used for the purpose of this study. These are defined below.

3.1.1 Primary sources

Primary sources are informative sources generating the information that does not exist already. Primary sources provide new, original and unorganized information. Primary sources examples include photographs, audio & video recordings, speeches and manuscripts.

3.1.2 Secondary sources

Secondary information sources contain for the most part information from primary documents or about them, such as reference literature, surveys, journals of abstracts, library catalogs, and bibliographical indexes and cards.

Chart 1 gives the summary for the information sources used in this study.

Chart1. Information Sources.

Objectives	Information Sources	
	Primary	**Secondary**
1. To create a project charter to get official authorization for project start.	Unstructured interviews, observation Government of Jamaica(GOJ) news, Jamaica Information Service (JIS) news, IDB website, MICAF website, inter-agency correspondences	PMBOK® Guide – Fifth Edition, scholarly articles reviews, pamphlets, textbooks, historical data.
2. To develop a scope management plan to include all the work that is to be done.	Unstructured interviews, observation, oral histories, advertisement, reports.	PMBOK® Guide – Fifth Edition, pamphlets, textbooks, scholarly articles reviews, journal articles review, reference books.
3. To create a schedule management plan to document the activities, their attributes and relationship in the timely completion of the project.	Interviews, observation, OPA, case studies official and unofficial records, reports, inter-agency correspondences, oral histories.	PMBOK® Guide – Fifth Edition Scholarly articles review, journal articles review, textbooks, reference books, literature reviews, historical data
4. To develop a cost management plan to provide the policies and procedures required to plan and manage the expending of resources needed for the project.	Interviews, observation MICAF accounting policy, IDB accounting policy, accounting reports, balance sheets, technical reports	PMBOK® Guide – Fifth Edition Scholarly articles review, journal articles review, literature reviews, case studies, accounting templates
5. To develop a quality management plan to identify and define the quality requirements of the project and service and meet organizational quality policy.	Unstructured interviews, observation, MICAF quality policy document and other OPA(quality accept/reject criteria), technical reports, quality records	PMBOK® Guide – Fifth Edition Scholarly articles review, journal articles review, textbooks, literature reviews, historical data.
6. To develop a risk management plan to document the categorization of identified risks, responsible risk owners, possible response to them and how to monitor and control risks.	Unstructured interviews, observation, OPA, case studies official and unofficial records, reports, inter-agency correspondences, oral histories.	PMBOK® Guide – Fifth Edition Scholarly articles, journal article review, textbooks, reference books, literature reviews, historical data

3.2 Research Methods

Research

Dictionary.com defines research as “a diligent and systematic inquiry or investigation into a subject in order to discover or revise facts, theories, applications, etc.”

Method

Dictionary.com defines method as “a manner or mode of procedure, especially an orderly, logical, or systematic way of instruction, inquiry, investigation, experiment, presentation, etc.”

3.2.1 Descriptive Research

Descriptive research, according to Kothari (2004), is “surveys and fact-finding enquiries of different kinds.” Kothari (2004) further explained, “the major purpose of descriptive research is description of the state of affairs as it exists at present.”

3.2.2 Analytical Research

Reference.com explains that an analytical research “explores a topic in-depth, often beginning with a question that asks why or how.” The intent of an analytical approach is not to persuade the reader of the writer's beliefs or opinions; it is to offer an interpretation that is supported by primary and secondary sources that ultimately support the conclusion.

For the purpose of this study, the researcher will be using descriptive and analytic research methods supported by primary and secondary sources. Chart 2 describes in the details the research methods to be employed.

Chart 2. Research Methods for GISMEPA Project.

Objectives	Descriptive Research Method	Analytical Research Method
1. To create a project charter to get official authorization for project start.	A description of the organizational need and the business case will be done using data from interviews, observations and document review to create the project charter.	Data from the sources identified in Chart 1 objective 1 above will be analyzed and used to create the project charter.
2. To develop a scope management plan to include all the work that is to be done.	A detailed description of the statement of work (SOW), scope statement and scope baseline for the project will be done using data from interviews, observations and document review to develop the scope	Data from the sources identified in Chart 1 objective 2 above will be analyzed and used to develop the scope management plan.

	management plan.	
3. To create a schedule management plan to document the activities, their attributes and relationship in the timely completion of the project.	A description of the relationship between the activities to be done on the project will be done using data from interviews, observations and document review to develop the schedule management plan.	Data from the sources identified in Chart 1 objective 3 above will be analyzed and used to create the schedule management plan.
4. To develop a cost management plan to provide the policies and procedures required to plan and manage the expending of resources needed for the project.	A description of the resources needed for project will be done using data from interviews, observations and document review to develop the cost management plan .	Data from the sources identified in Chart 1 objective 4 above will be analyzed and used to create the cost management plan.

5. To develop a quality management plan to identify and define the quality requirements of the project and service and meet organizational quality policy.	A description of the quality requirements for the project and service will be done using data from interviews, observations and document review to develop the quality management plan.	Data from the sources identified in Chart 1 objective 5 above will be analyzed and used to develop the quality management plan.
6. To develop a risk management plan to document the categorization of identified risks, responsible risk owners, possible response to them and how to monitor and control risks.	A description of the project risks will be done using data from interviews, observations and document review to develop the risk management plan.	Data from the sources identified in Chart 1 objective 6 above will be analyzed and used to develop the risk management plan.

3.3 Tools

A tool is “something tangible, such as a template or software programme, used in performing an activity to produce a product or result”, The PMI (2013) page 565.Chart 3 gives in detail the tools that will be used in this study.

Chart 3. Tools for GISMEPA Project.

Objectives	Tools
1. To create a project charter to get official authorization for project start	*Develop project charter* -Expert judgement -project charter template
2. To develop a scope management plan to include all the work that is to be done.	*Plan scope management* -Scope management template -Expert Judgment -Meetings *Collect requirements* -Requirements traceability matrix -Requirements documentation template *Define Scope* -Expert Judgment *Create WBS* -WBStool® -Expert Judgment *Validate Scope* -Audit *Control Scope* -Variance Analysis
3. To create a schedule management plan to document	*Plan Schedule Management* -Schedule management template

the activities, their attributes and relationship in the timely completion of the project.	-Expert Judgment *Define Activities* - Decomposition -Expert judgment *Sequence Activities* -Dependency determination Activity list template *Estimate Activity Durations* -Expert Judgment -Bottom-up estimating -Three point estimating *Estimate Activity Resources* *Develop Schedule* - WBStool® Microsoft Excel
4. To develop a cost management plan to provide the policies and procedures required to plan and manage the expending of resources needed for the project.	*Plan Cost Management* -Cost management plan template -Expert Judgment -Meetings -Cost baseline template *Estimate Costs* -Expert Judgment -Bottom-up estimating -Three-point estimating *Determine Budget* -Cost Aggregation -Reserve Analysis -Expert Judgment *Control Cost* Microsoft Excel

5. To develop a quality management plan to identify define the quality requirements of the project and service and meet organizational quality policy.	*Plan quality management* -Quality management plan template -Meetings -Brainstorming -Nominal group technique -Flowcharting -Benchmarking -Cost benefit analysis -Prioritization matrices *Control quality*, *Perform quality assurance* Microsoft Word
6. To develop a risk management plan to document the categorization of identified risks, responsible risk owners, possible response to them and how to monitor and control risks	*Plan risk management* -Risk management plan template -Meetings *Identify risks* -Documentation review -Information gathering techniques -Brainstorming - Assumptions analysis -Checklist analysis *Perform qualitative risk analysis* -Probability and impact matrix -Risk categorization *Plan risk response* -Expert judgement -Risk register template - Contingent risk response strategies

3.4. Assumptions and Constraints

3.4.1 Assumptions

An assumption is defined as “a factor in the planning process that is considered to be true, real, or certain, without proof or demonstration.” (PMI, 2013, p. 529).

The general assumptions for this study are:

1. It is assumed that all key stakeholders will be identified.
2. It is assumed that the project scope will not be changed in the short to medium term.
3. It is assumed that the IDB will facilitate and fund the project.
4. It is assumed that Roxanne Myers-Gayle, GlobalGAP Implementing Officer will be the lead on the project.
5. It is assumed that ACP will provide all relevant information needed for the project.
6. It is assumed that support from ACP and UCI will be available to develop and complete the project.

3.4.2 Constraints

A constraint is “a limiting factor that affects the execution of a project, programme, portfolio, or process.” (PMI, 2013, p. 533)

The general constraints considered for this study were:

1. The knowledge base of the project lead garnered during the Masters in Project Management is adequate to carry out the development of the project.
2. The completion of the project to develop the Project Management Plan for GIS mapping of the Ebony Park Agro Park will have to comply with the end date of November 17, 2017 to facilitate submission of the plan for review and approval.

The assumptions and constraints considered for the Final Graduation Project for each specific objective are outlined in Chart 4 below.

Chart 4. Assumptions and Constraints

Objectives	Assumptions	Constraints
1. To create a project charter to get official authorization for project start	The Project Management Plan will be developed before the subsidiary plans. All relevant information will be furnished by MICAF, ACP, IDB and other stakeholders. The project lead has the requisite knowledge and skills to conduct the project.	The allotted time for the project charter is 1 week. Adjustments to the project charter will be completed and reviewed within the specified time.
2. To develop a scope management plan to include all the work that is to be done.	It is assumed that all requirements will be identified, documented and included in the statement of work and in the WBS. It is assumed that the project scope will not be changed in the short to medium term. All relevant information will be furnished by MICAF, ACP, IDB and other stakeholders.	A short amount of time to collect and collate substantial amount of data. Adjustments to the scope management plan will be completed and reviewed within the specified time
3. To create a schedule management plan to	All activities and their interdependencies will	Adjustments to the schedule

	document the activities, their attributes and relationship in the timely completion of the project.	be identified. All relevant information will be furnished by MICAF, ACP, IDB and other stakeholders.	management plan will completed and reviewed within the specified time
4.	To develop a cost management plan to provide the policies and procedures required to plan and manage the expending of resources needed for the project.	Financial experts from MICAF, ACP, and IDB will be available for consultation for the development of and analysis of the cost baseline and cost management plan. All relevant information will be furnished by MICAF, ACP, IDB and other stakeholders.	Availability of funds for the project. Adjustments to the cost management plan will be completed and reviewed within the specified time
5.	To develop a quality management plan to identify and define the quality requirements of the project and service and meet organizational quality policy.	All relevant information will be furnished by MICAF, ACP, IDB and other stakeholders.	Adjustments to the quality management plan will be completed and reviewed within the specified time
6.	To develop a risk management plan to document the categorization of identified	All relevant information will be furnished by MICAF, ACP, IDB and other stakeholders to	Adjustments to the risk management plan will be

	risks, responsible risk owners, possible response to them and how to monitor and control risks.	develop the risk management plan.	completed and reviewed within the specified time.

3.5 Deliverables

"Any unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project", is how PMI (2013, p. 537) defined a deliverable. The deliverables for this project are:

1. The project charter
2. The Scope Management Plan
3. The Schedule (Time) Management Plan
4. The Cost Management Plan
5. The Quality Management Plan
6. The Risk Management Pan

The summary of deliverables is in chart 5:

Chart 5. Deliverables.

Objectives	Deliverables
1. To create a project charter to get official authorization for project start	The project charter that gives official authority for project start and the project manager is assigned.
2. To develop a scope management plan to include all the work that is to be done.	The scope management plan indicating the work breakdown packages, the work breakdown dictionary, statement of work and scope baseline.

3. To create a schedule management plan to document the activities, their attributes and relationship in the timely completion of the project.	The schedule management plan which documents activities, their attributes and relationship in the timely completion of the project. The schedule is also developed.
4. To develop a cost management plan to provide the policies and procedures required to plan and manage the expending of resources needed for the project.	The cost management plan that will outline the policies and procedures required to plan and manage the expending of resources. The cost baseline is included in the plan.
5. To develop a quality management plan to identify and define the quality requirements of the project and service and meet organizational quality policy.	The quality management plan which will identify and define the quality requirements of the project and service and meet organizational quality policy.
6. To develop a risk management plan to document the categorization of identified risks, responsible risk owners, possible response to them and how to monitor and control risks.	The risk management plan which will document the categorization of identified risks, responsible risk owners, and possible response to them and how to monitor and control risks.

4. RESULTS

In developing the Project Management Plan for the GIS mapping of Ebony Park Agro Park for this study, a Project Charter, was developed using informal interviews and the PMBOK® Guide as sources in addition to the application of descriptive and analytical research methods. The Project Charter was developed to formally authorize the project and provide the Project Manager with the authority to apply organizational resources to develop the Project Management Plan. The FGP GISMEPA Project Charter was developed using the UCI template as a guide.

The Project Management Plan is a compilation of requisite subsidiary plans. The subsidiary plans to be included (but not limited to) in the Project Management Pan are the 10 defined and explained in Chapter 2. However, the ones developed for the GISMEPA Project were Scope Management Plan, Schedule Management Plan, Cost Management Plan, Quality Management Plan and the Risk Management Plan. This was done because of time constraint but the plans give comprehensive documentation, clarity and guide. The subsidiary plans were developed using the general template headings of Introduction, Processes Approach, Roles and Responsibilities and Reporting.

Integrated Change Control

Similar to Develop project Charter and Develop Project Management Plan processes, the Perform Integrated Change Control is conducted in Project Integration Management. It is a monitoring and control process “of reviewing all change requests; approving changes and managing changes to deliverables, organizational process assets, project documents, and the project management plan”, (PMI, 2013). The inputs, tools and techniques and outputs to this process are:

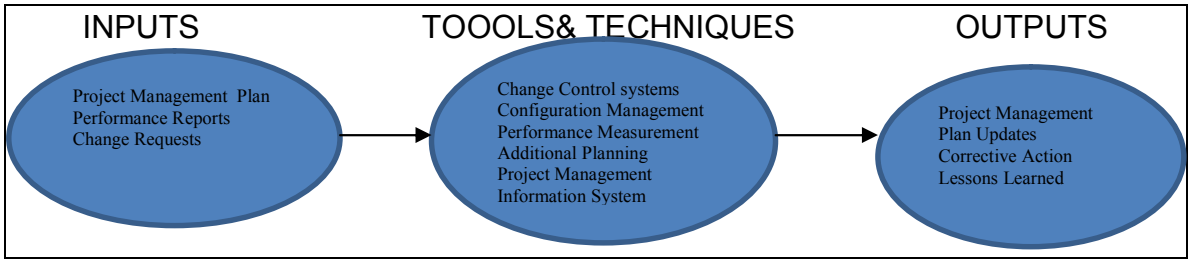

Figure 8. Perform Integrated Change Control Inputs, Tools Techniques and Outputs. (A Guide to the Project Management Body of Knowledge, Project Management Institute, 2013, Project Management Institute. Copyright 2013 by Project Management Institute, Inc.).

If a change to the project is needed, the process for recommending changes must be carried out. Any project team member or sponsor can request changes to the project scope. All change requests must be submitted to the Project Manager in the form of a project change request document (see Appendix 14). The Project Manager will then review the suggested change to the project. The Project Manager will then either deny the change request if it does not apply to the intent of the project or convene a change control meeting between the project team and Programme Director to review the change request further and perform an impact assessment of the change. If the change request receives initial approval by the Project Manager, the request will be formally submitted to the Sponsor for acceptance. The Sponsor will then formally accept the change by signing the project change control document. Upon acceptance of the change by the Sponsor, the Project Manager will update all project documents and communicate the change to all project team members and stakeholders.

All formal change requests for modifications to project documents, changes to deliverables baselines and the Project Management Plan for the GISMEPA Project should follow the procedure below:

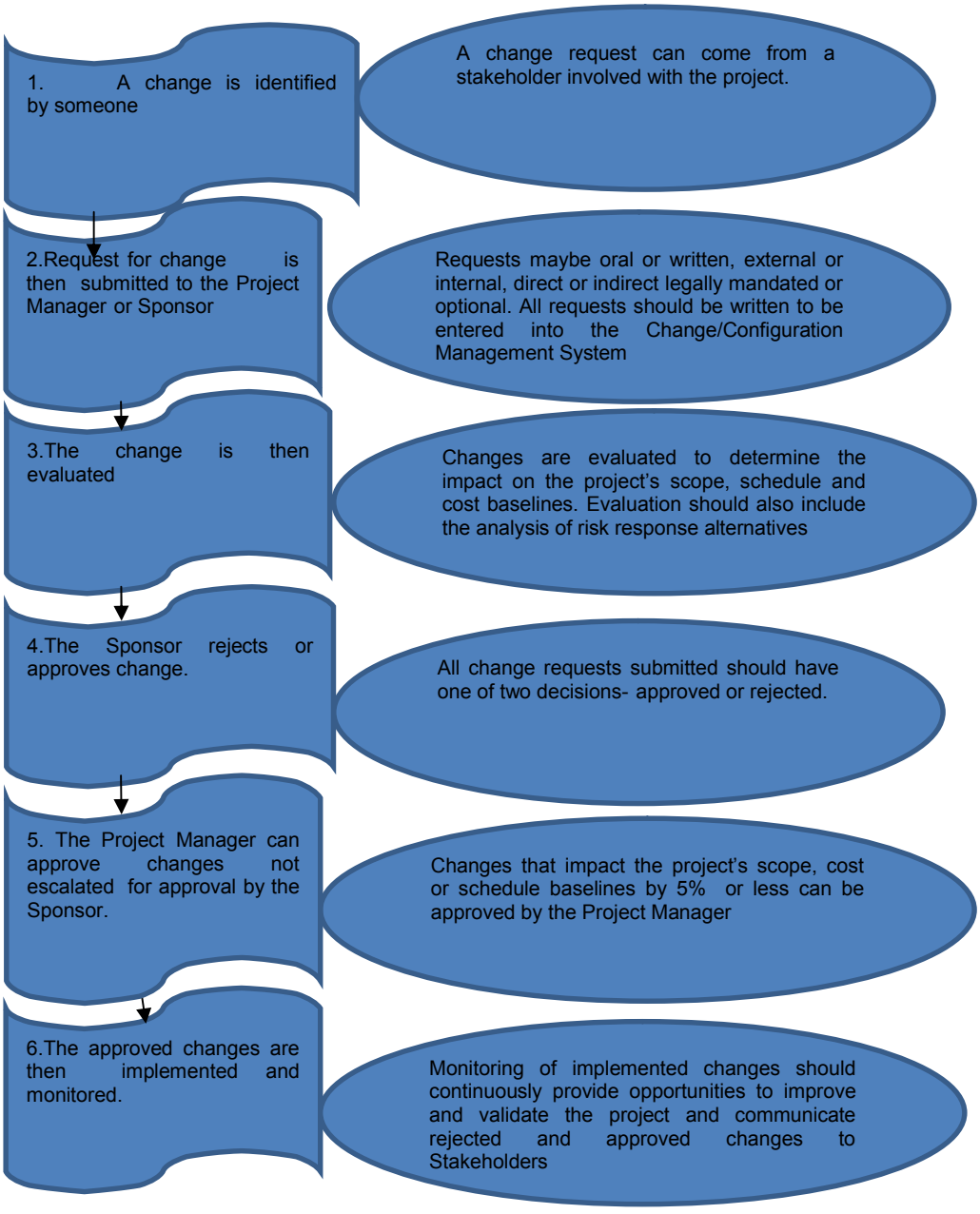

Figure 9. GISMEPA Project Change Control Procedure.

There are two documents used during the Integrated Change Control process:

1. Change Log**:** used to provide a record of all changes requested and decisions made.

2. Change Request Form: used to document details of the change, including the business case. Please see Appendix for the GISMEPA Project.

Details of the development of the Project Charter and the five subsidiary plans continue in Chapter 4 below.

PROJECT CHARTER

PROJECT MANAGEMENT PLAN FOR THE GIS MAPPING OF EBONY PARK AGRO PARK (GISMEPA) PROJECT

DATE:_____

PREPARED BY:_____

APPROVED BY:_____

4.1. PROJECT CHARTER

4.1.1 Introduction

The Develop Project Charter process is the first process in the Project Integration Management knowledge area which includes the processes and activities to identify, define, combine, unify, and co-ordinate the various processes and project management activities within the Project Management Process Groups" (Project Management Institute, 2013, p. 63). The project charter is especially important because it gives authorization for the start of the project, names the project manager and authorizes the application of sponsor resources to project activities. The inputs, tools and techniques to this process are depicted in Figure 10 below:

Figure 4-2. Develop Project Charter: Inputs, Tools and Techniques, and Outputs

Figure 10. Develop Project Charter: Inputs, Tools & Techniques, and Outputs. (A Guide to the Project Management Body of Knowledge (p. 66), Project Management Institute, 2013, Project Management Institute. Copyright 2013 by Project Management Institute, Inc.).

The objective of creating the project charter for this project is to get official authorization for project start. In developing the project charter, the template provided by UCI is used and the development is done under the following headings: project name, project objectives, project purpose, assumptions, constraints, risks, relevant historical background and naming the project

manager. These headings are developed as seen below and the charter template can be seen in Appendix 1.

4.1.2 Project Name

The project is the Project Management Plan for the GIS Mapping of Ebony Park Agro Park (GISMEPA) Project, Clarendon, Jamaica.

4.1.3 Project Objectives

The general objective of the project is to create a Project Management Plan for the GIS mapping of the Ebony Park Agro Park Project in Clarendon, Jamaica to provide a logical and sequential way to plan for similar projects in the future.
The specific objectives are:

1. To create a project charter to get official authorization for project start.
2. To develop a scope management plan to include all the work that is to be done.
3. To create a schedule management plan to document the activities, the attributes and relationships in the timely completion of the project.
4. To develop a cost management plan to provide the policies and procedures required to plan and manage the expending of resources needed for the project.
5. To develop a quality management plan to identify and define the quality requirements of the project and service and meet organizational quality policy.
6. To develop a risk management plan to document the categorization of identified risks, responsible risk owners, possible response to them and how to monitor and control risks.

4.1.4 Project Purpose

The Agricultural Competiveness Programme (ACP), though the current organization overseeing the project to implement the Global GAP standard project is not at a mature level in handling projects and so does not operate

within the project management framework. The current project had an issue date of January 2013 and project closet was set for December 31, 2016.

At this saje of the project, the mapping of the Agro Park is critical to completion the project. The GIS mapping of the Park will allow for auditan and ultimately Global GAP certificación. The new project closet date is Marcha 2018 with auditan scheduled for October 2017. The development of the Project Management Plan is critical to meeting the timeline. The plan will contain all the subsidiary plans decomposed into work packages where resources will be applied. The documentation of what will be needed to be done, when, by who and the money needed provide a framework in which to work to achieve success.

4.1.5 Assumptions

The general assumptions for this study are:

- It is assumed all key stakeholders will be identified.
- It is assumed that the project scope will not be changed in the short to medium term.
- It is assumed that the IDB will facilitate and fund the project.
- It is assumed that Roxanne Myers-Gayle, GlobalGAP Implementing Officer will be the lead on the project.
- It is assumed that all relevant information needed for the project will be provided by ACP.
- It is assumed that support from ACP and UCI will be available to develop and complete the project.

4.1.6 Constraints

The general constraints considered for the project are:

The knowledge base of the project lead garnered during the Masters in Project Management is adequate to develop the project.

The completion of the project to develop the Project Management Plan for GIS mapping of the Ebony Park Agro Park will have to comply with the end date of November 17, 2017 to facilitate submission of the plan for review and approval.

4.1.7 Risks

The risks to be considered for this project are:

- Project Management Knowledge: The plan may be developed by team Members with Little or no project management knowledge resultan in relevant knowledge áreas and processes not adequate described, analysed and developed.
- Werther: The Field visits and mapping of the Agro Park facilities have to be done in fair weather conditions.
- Financial: Absence of or Inadequate financial and information support from the IDB, MICAF and the ACP.

4.1.8 Budget

The proposed budget for the project is shown in chart 6 below.

Chart 6. GISMEPA Project Budget.

ITEMS	PROJECT COST ($JD)
GIS Consultant Fees	1,766,100
Project Manager Salary	666,666.67
Allowances for Compliance Manager	210,000.00
Meetings	90,000.00
Purchase software	42,400.00
Contingency and Management Reserves	36,663.00
Grand Total	2,923,389.67

4.1.9 Milestones List

The milestones and delivery dates for this project are
listed in chart 7 below:

Chart 7. FGP Milestones and Delivery Date.

MILESTONES	DELIVERY DATE
Project kick-off	June 26, 2017

Project Charter submission	August 25, 2017
Adjustment to Project Charter	September 8, 2017
Scope Management Plan submission	September 15, 2017
Adjustment to Scope Management Plan	September 18, 2017
Schedule Management Plan submission	September 22, 2017
Adjustment to Schedule Management Plan.	September 28, 2017
Cost Management Plan submission	October 5, 2017
Adjustment to Cost Management Plan.	October 9, 2017
Quality Management Plan submission	October 13, 2017
Adjustment to Quality Management Plan	October 15, 2017
Risk Management Plan submission	October 17, 2017
Adjustment Risk Management Plan	October 24, 2017
Review of Project Management Plan	November 3, 2017
Adjustments to Project Management Plan	November 10, 2017
Approval of Project Management Plan.	November 17, 2017

4.1.10 Stakeholders

The stakeholders for the project are divided into two groups: direct and indirect.

Direct stakeholders:

- GIS Consultant
- Sponsoring Bank (IDB)
- Project Coordination Unit, (MICAF) Director
- ACP Programme Director
- ACP Chief Financial Officer
- ACP Component 2 Coordinator
- ACP Compliance Manager
- AIC
- Roxanne Myers-Gayle

Indirect stakeholders:

- Park Manager, Ebony Park

- Farmers

4.1.11 Project Approval

The approval process is done in stages with the Project Management Plan being pre-approved by the ACP Programme Director and Compliance Manager. The final stage involves the approval of completed digital and printed maps of the Ebony Park Agro Park against the JAD 2001 Standard Projections by the IDB.

4.1.12. Naming the Project Manager

Roxanne Myers-Gayle is the person responsible for the implementation of the GlobalGAP standard on the Ebony Park Agro Park and for overseeing and lending support to the mapping of the Park and as such is named the Project Manager for developing the Project Management Plan.

SCOPE MANAGEMENT PLAN

PROJECT MANAGEMENT PLAN FOR THE GIS MAPPING OF EBONY PARK AGRO PARK (GISMEPA) PROJECT

DATE:

VERSION #:	**REVISION DATE:**
PREPARED BY:	**APPROVED BY:**

4.2. SCOPE MANAGEMENT PLAN

4.2.1 Introduction

Project Scope Management includes all the work required to complete the project and at the same time excludes work which is not necessary to complete it. The Scope Management Plan details how the project scope will be defined, developed, and verified. This document clearly defines who is responsible for managing the projects' scope and acts as a guide for managing and controlling the scope. Project Scope Management follows a five step process; Collect Requirements, Define Scope, Create WBS, Validate Scope, and Control Scope.

4.2.1.1 Use of the Scope Management Plan

The approved Scope Management Plan for the GISMEPA Project receives a version number; the first being 001 and an issue date. The issue date never changes. Once there has been an approved update to this Scope Management Plan the updated version should be given a version number and the revision date recorded. A change to this Scope Management plan is the responsibility of the Project Manager or designee.

4.2.2 Processes

4.2.2.1 Collect Requirements

This first step is the process by which the requirements needed for the GISMEPA Project are defined and documented to meet all project objectives. According to PMBOK (PMI, 2013), the inputs to this process are the project charter and stakeholder register. From these, the team will identify requirements, collectively discuss details associated with meeting each requirement, conduct interviews and have discussions to clarify the requirements, and document the requirements in sufficient detail to measure them once the project begins the execution phase. The requirements for the GISMEPA Project are depicted in the Requirements Document shown in Figure 11 below. This documentation also serves as an input to the next step in the process which is to define scope.

GIS MAPPING OF EBONY PARK AGRO PARK PROJECT, JAMAICA
REQUIREMENTS DOCUMENTATION

INTRODUCTION
The general objective of the ACP is to contribute to the competitiveness of the agricultural sector in Jamaica through the achievement of three specific objectives: (i) increase the capacity of small and medium size famers to access national and international markets; (ii) increase the performance of the country's food safety and quality management systems; and (iii) foster the development of agricultural and agro-processing value chains. This programme consists of three components. Component one : Development of Farm-To-Market Linkages, Component two: Food Safety and Quality Management Systems and Component three: Agribusiness Value Chain Development. This document contains the requiirements for the GIS Mapping of Ebony Park (GISMEPA) Project

EXCLUSION
This project does not include ongoing operations

PERSONEL AND OTHER RESOURCES
Only internal personnel and resources may be used for this project. The exception is the GIS Consultant who will be contracted for the consultancy. Government Officers are not allowed to sign another contract. The GIS Consultant should possess a Bachelor's Degree in Land Surveying, GIS Panning or equivalent and 5 years working experience in Land Surveying or Physical Planning.

DURATION
The project is not to exceed 60 days lin duration. Work days are Monday to Friday, however, some activities can be be done outside of this as some project Team members may not be able to complete tasks during the regular work week due to other obligations. Start date for project is slated for December 11, 2017 and end date February 8, 2018.

COST
The budget for this project should not exceed $ JD 2,930,000,00 in spending. Total funding will be done by the IDB and this amount includes salaries for the Project Manager as well as the GIS Consultant..

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PRODUCT
The product scope for this project should include the following parameters:
Lambert Conformal Conic Projection
Datum WGS84,
False easting 750000m,
False northing 650000m,
Latitude of 2nd parallel 18°N,
Latitude of central Meridian 77°N,
Latitude of origin of projection 18° N
Spheroid Name WGS84
6 stamped hardcopies at scale 1:5000
AutoCAD electronical(digital) copy

GENERAL REQUIREMENTS
The general requiremats for this project are:
Information support from MICAF
Terms of Reference (TOR) for the GIS Consultant
Personnel Support from MICAF, ACP and IDB
Expert Judgement will be sought through intersectora collaboration
GIS Consultant is responsible for using calibrated equipments for mapping.

ASSUMPTIONS AND C0NSTRAINTS
It is assumed that:
Maps will meet requirements
Sufficient number of personnel are available to complete the project.
Support will come from IDB and ACP
The constraints are:
Time- delays due to re-work
Possible disruption due to inclement weather
Availability of personnel

PREPARED BY:_____DATE:_____

REVIEWED BY:_____ DATE: _____

APPROVED BY:_____ DATE: _____

Figure 11. GISMEPA Project Requirerments Documentation.

4.2.2.2 Define Scope

This step is critical to project success.

This Scope Management Plan outlines the requirements for the development of a detailed project/product description to include deliverables, assumptions, and

constraints and establishes the framework within which project work must be performed.

4.2.2.3 Create WBS

This process breaks project deliverables down into progressively smaller and more manageable components through a process called decomposition, which at the lowest level, are called work packages. This is known as decomposition. This hierarchical structure allows for more simplistic scheduling, costing, monitoring, and controlling the project.

4.2.2.4 Validate Scope

This is the process by which the project team receives a formalized acceptance of all deliverables with the sponsor.

4.2.2.5 Control Scope

This is the process of monitoring and controlling the project and product scope as well as managing any changes in the scope baseline. Changes may be necessary to the project scope but it is imperative they are controlled and integrated in order to prevent scope creep.

4.2.3 Scope Management Approach

This Scope Management Plan provides the scope framework for the GISMEPA Project. The plan documents the scope management approach; roles and responsibilities as they pertain to project scope; scope definition; verification and control measures; scope change control; and the project's work breakdown structure and reporting. Any project communication which pertains to the project's scope should adhere to the Scope Management Plan.

The purpose of the GISMEPA Project is to plan for the mapping and creation of completed digital and printed maps of the Ebony Park Agro Park which will be used to identify and locate food safety infrastructure and farmers' plots which are critical elements to be used during the audit process for the

certification of the Park in the GlobalGAP version 5 Standard. A GIS Consultant is needed for this project and such services will be outsourced.

Scope management will be the sole responsibility of the Project Manager. The scope for this project is defined by the Scope Statement, Work Breakdown Structure (WBS) and WBS Dictionary. The Project Manager, Sponsor and Stakeholders will establish and approve documentation for measuring project scope which includes deliverable quality checklists and work performance measurements.

Proposed scope changes may be initiated by the Project Manager, Stakeholders or any member of the project team. All change requests will be submitted to the Project Manager who will, in conjunction with the Programme Director, evaluate the requested scope change. Upon acceptance of the scope change request, the Programme Manager will submit the scope change request to the Project Sponsor for a “no objection”. Upon approval of scope changes by the Project Sponsor, the Project Manager will update all project documents and communicate the scope change to all stakeholders. Based on feedback and input from the Project Manager and Stakeholders, the Project Sponsor is responsible for the acceptance of the final project deliverables and project scope.

4.2.3.1 Scope Definition

The scope definition details the process of developing a detailed description of the project and its deliverables. This can only be completed after the requirements have been identified and defined during the requirements definition process. During the requirements definition process, two documents are created; Requirements Documentation and the Requirements Traceability Matrix (see Appendix 4). These documents can be referred to when defining the projects’ scope. Chart 8 depicts the tools used for development of the scope management plan for the GISMEPA Project.

The scope for the GISMEPA project was defined through a comprehensive requirements collection process. First, a thorough search of the MICAF database

is done to ascertain the availability of maps (or sections thereof) of the Agro Parks to be included in the project (digital or otherwise) and to determine the extent to which these would have to be reproduced and updated or developed from scratch. Other related departments such as AIC, NIC and National Land Agency (NLA) should be contacted to ascertain if these maps are available. From this information, the Component 2 Coordinator and the Programme Manager develop the requirements document, requirement traceability matrix (Appendix 4) and the terms of reference for the GIS Consultant.

Project description and deliverables based on the requirements collection process and input from subject matter experts on GIS mapping and standards are to be included in this document. This process of consulting expert judgment will provide feedback on the most effective ways to meet the original requirements. The experts should provide standardized maps of compatible standard and quality for the identification and location of the food safety infrastructures, roads, waterways and farmers' plots to facilitate an efficient and effective GlobalGAP Version 5 Standard Certification audit process.

Chart 8. Tools used to develop GISMEPA Project Scope Management Plan.

Tool	**Use**
WBSTool®	To create the WBS
Requirement Traceability Matrix Template	To create the Requirement Traceability Matrix
Activiti List Template	Activity List
Activity Estimates and Duration Templates	Activity Estimates & Duration
Requirement Document Template	To identify and define requirements
Microsoft Excel	To create charts
Microsoft Word	To create plan

4.2.3.2 Project Scope Statement

This Project Scope Statement serves as a baseline document for defining the scope of the GISMEPA Project, project deliverables, work which is needed to accomplish the deliverables, and effectively communicate a common understanding of the project's scope among all stakeholders. All project work should occur within the framework of the project scope statement and directly support the project deliverables. Any changes to the scope statement must be vetted through the approved Project Change Management Process (see section 4) prior to implementation. The completion date for this project is February 8, 2018.

4.2.3.2.1 Project Purpose and Justification

The GISMEPA Project has been approved to plan, map Ebony Park Agro Park and produce complete maps to be used in the audit of the Agro Park during the Global GAP Certification process. The purpose of this project is to provide GIS data of water ways, road networks, irrigation works, food safety infrastructure and each farmer's plot for use in the Agriculture sector as well as for inter-agency collaborations. Currently, there are no base maps of Ebony Park Agro Park and by implementing the GISMEPA Project allows for easy locations of agricultural resources and infrastructure. The successful implementation of this project is expected to provide a pilot for the GIS mapping of other agricultural economic zones and by extension provide GIS data and complete maps to assist MICAF in future planning and decision- making.

4.2.3.2.2 Scope Description

The scope of the GISMEPA Project is to plan, map Ebony Park Agro Park and produce complete maps to be used in the audit of the Agro Park during the Global GAP Certification process. A GIS Consultant will be recruited and will be responsible for mapping the Agro Park and use the GIS data sets to create complete maps developed using the JAD2001 Standard. This Standard requires that maps be produced using the following:

- Lambert Conformal Conic Projection
- Datum WGS84,
- False easting 750000m,
- False northing 650000m,
- Latitude of 2nd parallel 18°N,
- Latitude of central Meridian 77°N,
- Latitude of origin of projection 18° N
- Spheroid Name WGS84

ACP requires that 6 printed maps at a scale of 1:15000. These are to be stamped. The digital copy of the map should be presented in AutoCAD.
The scope of this project includes all requirements gathering, planning, design, validation and acceptance of the maps.

4.2.3.2.3 High Level Requirements

The following high level requirements have been identified for the GISMEPA Project:

1. Recruited qualified and experienced GIS Consultant
2. GIS Data sets for Ebony Park Agro Park
3. Base Maps
4. Validation of Maps
5. Accept Completed Maps

The GIS Consultant should possess a Bachelor's Degree in Land Surveying, GIS Panning or equivalent and 5 years working experience in Land Surveying or Physical Planning. This project will start December 11 2017 and end on February 8, 2018.

4.2.3.2.4 Boundaries

The GISMEPA Project includes all work associated with planning, mapping, map development, map validation, and acceptance of the validated maps. This includes requirements gathering, gathering input from relevant departments and

agencies, developing GIS data sets, creating maps against JAD 2001 Standard and ACP requirements and accepting the validated maps through the deliverable acceptance procedure.

This project does not include ongoing operations. Only internal personnel and resources may be used for this project with the exception of the GIS Consultant. Additionally, the project is not to exceed 60 days in duration and$ JD 2,930,000 in spending. Work days are Monday to Friday; however, some activities can be done outside of this as some Project Team members may not be able to complete tasks during the regular work week due to other obligations

4.2.3.2.5 Deliverables

There are several deliverables which will be produced as a result of the implementation and successful completion of the GISMEPA Project. If all of the following deliverables are not met then the project will not be considered successful. The Project Manager is responsible for ensuring the completion of these deliverables.

1. Deliverable 1 – Complete GIS data sets produced using calibrated GIS equipment and meeting the specifications described in the Project Scope Description.
2. Deliverable 2 – 2 base maps inspected and improved by using in mock audits.
3. Deliverable 3 – A final mock audit report.

4. Deliverable 4 – A completed and validated map of Ebony Park Agro Park.

4.2.3.2.6 Acceptance Criteria

Acceptance criteria have been established for the GISMEPA Project to ensure thorough vetting and successful completion of the project. The acceptance

criteria are both qualitative and quantitative in nature. All acceptance criteria must be met in order to achieve success for this project:

1. Meet all deliverables within scheduled time and budget tolerances
2. Meet the JAD 2001 Map projection Standard 100%.
3. Reduce schedule delays by at least 10%,
4. Meet Global GAP Audit requirements,
5. Improve MICAF's capability of locating Agricultural resources.

4.2.3.2.7 Assumptions and Contsraints

Assumptions for this project are that support will be provided by the project sponsor, IDB, and those adequate internal resources such as personnel. money and information are available for the successful completion of this project. It is also assumed that the NIC, AIC and NLA have GIS base maps that can be built on to produce the complete maps of the park.

The constraints for this project include:

- Time- auditing of the Park for GlobalGAP certification is dependent on Ebony Park being mapped and this poses a time constraint on the project.
- Weather/Climatic Conditions-Site visits, pre-mapping and mapping have to be done in fair weather conditions.
- Personnel-with the exception of the GIS Consultant, only internal personnel will be used on the project team and this can result in delays as team members are responsible for other duties outside this project.

4.2.3.3 Work Breakdown Structure

In order to effectively manage the work required to complete this project, the work will be subdivided into individual work packages which will not exceed 40 hours of work per week. This will allow the Project Manager to more effectively manage the project's scope as the project team works on the tasks necessary for project completion. The project is broken down into four phases: the planning phase where the Terms of Reference (TOR) for the GIS Consultant will be

developed; the mapping or execution phase where the Agro Park will be mapped and the maps will be produced; the validation phase where the maps will be used in mock audits and adjusted according to the requirements and the delivery of complete maps for approval by the Project Sponsor. Each of these phases is then subdivided further down into work packages which will require no more than 40 hours of work and no less than 4 hours of work per week. The WBS for the GISMEPA Project is displayed in Figure 12 below.

4.2.3.4 WBS Dictionary

Project completion requires that a WBS Dictionary be developed and used. “The WBS Dictionary has a detailed description of work and technical documentation for each WBS element”, PMI 2013. In the WBS Dictionary, the deliverables, budget and resource needs for each element are to be included. The project team will use the WBS Dictionary as a statement of work for each WBS element. Chart 9 is the WBS Dictionary to be used in the GISMEPA Project (Please see Appendix 3).

Figure 12. GISMEPA Project WBS.

4.2.3.5 Scope validation

Scope validation discusses how the deliverables will be verified against the original scope and how the deliverables from the project will be formally accepted. There should be formal acceptance of the deliverables throughout the lifecycle of the project and not as a single deliverable at the end of the project.
As the GISMEPA project progresses, the Programme Director, Compliance Manager and Project Manager will verify interim project deliverables against the original scope as defined in the scope statement, WBS and WBS Dictionary. Once the Project Manager verifies that the scope meets the requirements defined in the project plan, the Programme Director, Project Manager and Sponsor will meet for formal acceptance of the deliverable. During this meeting the Project Manager will present the deliverable to the Project Sponsor for formal acceptance. The Project Sponsor will accept the deliverable by signing the project deliverable acceptance form (see Appendix 13). This will ensure that project work remains within the scope of the project on a consistent basis throughout the life of the project.

4.2.3.6 Scope Control

Scope control is the process of monitoring the status of the scope of the project. This section of the Scope Management Plan also details the change process for making changes to the scope baseline. The Project Manager and the project team will work together to control the scope of the project. The project team will leverage the WBS Dictionary by using it as a statement of work for each WBS element. The project team will ensure that they perform only the work described in the WBS dictionary and generate the defined deliverables for each WBS element. The Project Manager will oversee the project team and the progression of the project to ensure that this scope control process is followed.
(See Appendix 14) and section 4 for the integrated change request form and procedure respectively.

4.2.4 Scope Management Roles and Responsibilities

In order to successfully manage a projects' scope, it is important that all roles and responsibilities for scope management are clearly defined in the Scope Management Plan. This section defines the role of the Project Manager, Project Team, Stakeholders and other key persons who are involved in managing the scope of the project. It should state who is responsible for scope management and who is responsible for accepting the deliverables of the project as defined by The Project Manager, Sponsor and team will all play key roles in managing the scope of this project. As such, the project sponsor, manager, and team members must be aware of their responsibilities in order to ensure that work performed on the project is within the established scope throughout the entire duration of the project. Chart 10 below defines the roles and responsibilities for the scope management of this project.

Chart 10. Scope Management Roles and Responsibilities.

NAME	ROLE	RESPONSIBILITIES
IDB	Sponsor	• Approve or deny scope change requests as appropriate. • Evaluate need for scope change requests Accept project deliverables.
Petronia Colley	Programme Director	• Liaise with Project Manager and Sponsor on scope changes.
Roxanne Myers-Gayle	Project Manager	• Measure and validate project scope • Facilitate scope change requests. • Facilitate impact assessments of scope change requests. • Organize and facilitate scheduled change control meetings. • Communicate outcomes of scope change requests. • Update project documents upon approval of all scope changes. • Validate scope change requests

Naeen Jackson	Component 2 Coordinator	• Participate in impact assessments of scope change requests. • Communicate outcomes of scope change requests to team. • Facilitate team level change review process.
Loron Pinnock Brown	Compliance Manager	• Participate in defining change resolutions. • Evaluate the need for scope changes and communicate them to the project manager as necessary
-	GIS Consultant	• Participate in defining change resolutions. • Evaluate the need for scope changes and communicate them to the Project Manager as necessary.

4.2.5 Scope Management Reporting

Scope Management Reporting on the GISMEPA Project should be vertical and horizontal. Decisions should be passed down from Sponsor to Programme Manager to the Project Manager. These decisions should then be communicated laterally to the project team members. All reporting protocol should be detailed in a Communication Management Plan (not developed in this study) to ensure that the communications needs of all stakeholders are met and that they are engaged.

Reporting for Scope Management will be included in the monthly project status report. The Monthly Project Status Report will include a section labeled, “Scope Management”. This section will contain the scope baseline identified in this plan. All scope requirements identified in this Scope Management Plan will be reported on including any non-conformances and corrective actions which are planned. Change requests which are triggered based upon project scope issues will be identified and tracked in this report.

SCHEDULE MANAGEMENT PLAN

PROJECT MANAGEMENT PLAN FOR THE GIS MAPPING OF EBONY PARK AGRO PARK (GISMEPA) PROJECT

DATE:

VERSION #:	**REVISION DATE:**
PREPARED BY:	**APPROVED BY:**

4.3 SCHEDULE MANAGEMENT PLAN

4.3.1. Introduction

The purpose of the GISMEPA Project Schedule Management Plan is to define the approach the project team will use to create the project schedule. This plan also includes how the team will monitor the project schedule and manage changes after the baseline schedule is approved. This include identifying, analyzing, documenting, prioritizing, approving or rejecting, and publishing all schedule-related changes.

4.3.1.1 Use of the Schedule Management Plan

The approved Schedule Management Plan for the GISMEPA Project receives a version number; the first being 001 and an issue date. The issue date never changes. Once there has been an approved update to this Schedule Management Plan the updated version should be given a version number and the revision date recorded. A change to this Schedule Management Plan is the responsibility of the Project Manager or designee.

4.3.2 Processes

4.3.2.1 Define Activities

In defining activities for the GISMEPA Project, the Programme Manager, Project Manager, Project Team and the GIS Consultant will have a meeting prior to project kick-off and define all identified tasks/activity required to complete the project. An activity list will be developed during this meeting. This activity list will contain the description of all activities. Each activity should have a reference number and name. Description of work should be in enough detail so that the person(s) responsible understand what is required to complete the activity. The list should name the task owners responsible for the work. There may be one team member or several. There may also be a primary and an alternate designee. Please see Activity list in Chart 11 below for the GISMEPA Project.

Chart 11. GISMEPA Project Activity List.

ID#	WBS ID	ACTIVITY	DESCRIPTION
01	1.1	DRAFT TOR FOR GIS CONSULTANT	Prepare the Terms of Reference(TOR) for the GIS Consutant. This TOR will constitute the requirement documentation (see Appendix) for the GISMEPA Project.
02	1.1.1	SUBMIT TOR FOR IDB APPROVAL	Submit completed TOR to the Project Sponsor for approval
03	1.1.1.1	ADVERTISE JOB	The Component 2 Co-ordinator will advertise the consultancy within MICAF, NIC, and AIC and the general public (in Newspaper). This advertisement should run for one (1) week.
04	1.2	CONDUCT INTERVIEWS	Once the job has been advertised and candidates are selected based on qualification and experience, the Programme manager, Project Manager and the Compliance Manager will conduct a three panel interview
05	1.3	PREPARE CONTRACT	Once the GIS Consultant has been selected, a contract will be drafted and escalated to the Project Sponsor for approval.
06	1.3.1	SIGN CONTRACT	Once the terms of the contract have been explained to the selected candidate and are accepted, it should be signed by the GIS Consultant, the Programme Manager and the Sponsor.
08	2.1	RETRIEVE AVAILABLE GIS INFORMATION FOR EBONY PARK	The GIS Consultant will research and retrieve (if available) maps and/or GPS data from relevant departments of MICAF or inter-related organization(NIC, AIC, National Land Agency-NLA).
09	2.1.1	SITE VISIT	The GIS Consultant will make initial site visits with the Project Manager to verify the maps and/or GPS data with what currently exists on Ebony Park. A report should then be submitted to the Project Manager. This report should include a list of the farmer's plot, roads, structures and irrigation works that are on the Agro Park.
10	2.1.1.1	PRE-MAPPING OF AGRO PARK	An initial mapping of the Agro Park should be conducted by the GIS Consultant using his /her own calibrated equipment. This mapping should be against GPS data that exist or from scratch if none exist.
11	2.1.1.1.1	ADJUSTMENTS	The GIS Consultant should make changes to GPS data.
12	2.2	VERIFY MAPPING DATA	The GIS Consultant, Project Manager and Compliance Manager should conduct a site visit to do a final mapping exercise to verify that the GPS data for all plots, structure, road and irrigation works are captured
13	3.1	PRODUCE TRIAL MAPS	The GIS Consultant should produce three trial maps at a scale of 1:15000.
14	3.1.1	TRIAL MAP 1 AND INITIAL INSPECTION	The GIS Consultant should print an initial map (Trial map 1) at a scale of 1:15000 and this map should be inspected by the Compliance Manager, Project Manager and the MICAF QC Personnel using the requirements set out in the requirements documentation. A report should be

			prepared by the GIS Consultant to include all corrections to be applied to Trial Map 1 and any GPS data to be included. This map will be used to produce the third trial map subject to adjustments.
15	3.1.1.1	TRIAL MAP 2 AND FOLLOW-UP INSPECTION	The GIS Consultant should print a second map (Trial map 2) at a scale of 1:15000 using updated GPS data This map should be inspected by the Compliance Manager, Project Manager and the MICAF QC Personnel using the requirements set out in the requirements documentation. A report should be prepared by the GIS Consultant to include all corrections to be applied to Trial Map 2 and any GPS data to be included. This map will be used to produce the third trial map subject to adjustments.
16	3.1.1.1.1	TRIAL MAP 3 AND FINAL INSPECTION	The GIS Consultant should print a third map (Trial map 3) at a scale of 1:15000 including all updated GPS data. This map should be inspected by the Compliance Manager, Project Manager and the MICAF QC Personnel using the requirements set out in the requirements documentation. A report should be prepared by the GIS Consultant to include all corrections to be applied to Trial Map 3 and any GPS data to be included. This will be the final map subject to all adjustments.
17	4.1.1	MOCK AUDIT 1 USING ADJUSTED TRIAL MAP 1	The Project Manager and the Compliance Manager should conduct a mock audit using a checklist (prepared by the GIS Consultant) consisting of the list of farmers plot, structures, roads and irrigation works and the adjustedTrial Map 1. A report containing the result of the audit should be prepared by the Compliance Manager and submit to the Project Manager.
18	4.1.1.1	FOLOW-UP MOCK AUDIT USING ADJUSTED TRIAL MAP 2	The Project Manager and the Compliance Manager should conduct a second mock audit using a checklist (prepared by the GIS Consultant) consisting of the list of farmers plot, structures, roads and irrigation works and the adjustedTrial Map 2. A report containing the result of the audit should be prepared by the Compliance Manager and submit to the Project Manager.
19	4.1.1.1.1	FINAL MOCK AUDIT USING ADJUSTED TRIAL MAP 3	The Project Manager and the Compliance Manager should conduct a final mock audit using a checklist (prepared by the GIS Consultant) consisting of the list of farmers plot, structures, roads and irrigation works and the adjustedTrial Map 3. A report containing the result of the audit should be prepared by the Compliance Manager and submit to the Project Manager.
20	5	PRESENT MAPS TO PROJECT SPONSOR	The adjusted Trial Map 3 consisting of all corrections should be submitted in printed and digital form by the GIS Consultant to the Project Manager. The Project Manager and the Programme Manager should meet with the GIS Consultant for explanation and sign off on the parameters. A report of this sign-off and the maps should then be submitted to the Project Sponsor for

			approval.
21	5.1	FINAL APPROVAL OF MAPS	The Project Sponsor approves the maps provided any queries that may arise are resolved.

4.3.2.2 Sequence Activities

Activity sequencing will be used to determine the order of work packages and assign relationships between project activities. Sequencing the activities of the GISMEPA Project was done using dependency determination to document activity relationships. The three types of dependencies; mandatory, discretionary and external were used. The activity attributes; an input to this process is displayed in Appendix 7.

4.3.2.3 Estimate Activity Duration and Resources

Resource estimating will be used to assign resources to work packages in order to complete schedule development. Activity resources are estimated using the WBS as input and bottom-up technique along with Three-Point Estimating in which the Programme Evaluation Review Technique (PERT) is used to roll up the estimate. Project Management Institute (2011a, p. 30) described three-point estimate as a "range-estimating technique, in which three separate values for the duration of the project or the cost of individual elements of the project are provided: optimistic, pessimistic, and most likely". PERT is used to determine the duration of activities. The PERT formula is as follows:

$$\text{PERT} = \frac{(O + 4ML + P)}{6}$$

Where:

O is the Optimistic estimate

ML is the Most Likely estimate

P is the Pessimistic estimate.

4.3.2.4 Estimate Activity Durations

Activity duration estimating will be used to calculate the number of work periods required to complete work packages on the project. Three Point Estimating is

also used to estimate activity durations for the GISMEPA Project. See Chart 12 for estimates of activity durations for the GISMEPA Project.

Chart 12: Activity Duration Estimates

NO	WBS ID	ACTIVITY	PREDECESSOR	START DATE	END DATE	DURATION (DAYS)
01	1.1	DRAFT TOR FOR GIS CONSULTANT	-	11-12-2017	15-12-2017	5
02	1.1.1	SUBMIT TOR FOR IDB APPROVAL	01	11-12-2017	15-12-2017	5
03	1.1.1.1	ADVERTISE JOB	01,02	16-12-2017	20-12-2017	5
04	1.2	CONDUCT INTERVIEWS	03	23-12-2017	23-12-2017	1
05	1.3	PREPARE CONTRACT	04	2-1-2018	5-1-2018	5
06	1.3.1	SIGN CONTRACT	07	5-1-2018	5-1-2018	1
08	2.1	RETRIEVE AVAILABLE GIS INFORMATION FOR EBONY PARK	05	08-1-2018	17-1-2018	10
09	2.1.1	SITE VISIT	06	13-1-2018	13-1-2018	1
10	2.1.1.1	PRE-MAPPING OF AGRO PARK	06	15-1-2018	19-1-2018	5
11	2.1.1.1.1	ADJUSTMENTS	09	15-1-2018	19-1-2018	5
12	2.2	VERIFY MAPPING DATA	10	19-1-2018	19-1-2018	1
13	3.1	PRODUCE TRIAL MAPS	10,11	19-1-2018	26-1-2018	10
14	3.1.1	TRIAL MAP 1 AND	-	19-2-	23-1-	5

		INITIAL INSPECTION		2018	2018	
15	3.1.1.1	TRIAL MAP 2 AND FOLLOW-UP INSPECTION	10, 11, 12	22-1-2018	24-1-2018	3
16	3.1.1.1.1	TRIAL MAP 3 AND FINAL INSPECTION	10, 11, 14	25-1-2018	26-1-2018	2
17	4.1.1	MOCK AUDIT 1 USING ADJUSTED TRIAL MAP 1	10, 11, 15	24-1-2018	24-1-2018	1
18	4.1.1.1	FOLOW-UP MOCK AUDIT USING ADJUSTED TRIAL MAP 2	14	25-1-2018	25-1-2018	1
19	4.1.1.1.1	FINAL MOCK AUDIT USING ADJUSTED TRIAL MAP 3	15	26-1-2018	26-1-2018	2
20	5	PRESENT MAPS TO PROJECT SPONSOR	16	1-2-2018	7-2-2018	5
21	5.1	FINAL APPROVAL OF MAPS	17, 18, 19	8-2-2018	8-2-2018	1

The calculations for the duration of each activity is done using PERT and is presented in Chart 13 below:

Chart 13. PERT Calculations for GISMEPA Project activities duration.

No.	WBS ID	Optimistic Duration (O)	Most Likely Duration (ML)	Pessimistic Duration (P)	Expected Duration, $t_e = \frac{O+4ML+P}{6}$	Variance, $\sigma^2 = \left(\frac{P-O}{6}\right)^2$
01	1.1	2	3	4	3.00	0.11
02	1.1.1	1	2	3	2.00	0.11
03	1.1.1.1	2	3	4	3.00	0.11
04	1.2	2	2	5	2.50	0.25
05	1.3	5	3	7	4.00	0.11
06	1.3.1	1	1	2	1.16	0.03

08	2.1	1	2	5	2.33	0.44
09	2.1.1	3	5	7	3.33	0.44
10	2.1.1.1	3	5	7	3.33	0.44
11	2.1.1.1.1	1	2	5	2.33	0.44
12	2.2	4	6	8	6.00	0.44
13	3.1	3	5	7	5.00	0.44
14	3.1.1	2	3	4	3.00	0.11
15	3.1.1.1	2	3	4	3.00	0.11
16	3.1.1.1.1	2	3	4	3.00	0.11
17	4.1.1	1	2	5	2.33	0.44
18	4.1.1.1	1	2	5	2.33	0.44
19	4.1.1.1.1	1	2	5	2.33	0.44
20	5	1	3	5	3.00	0.44
21	5.1	1	2	5	2.33	0.44
					$\sum t_e = 54.64$ days	

4.3.2.5 Develop Schedule

The GISMEPA Project schedule was created using WBStool® starting with the deliverables identified in the project's WBS. This was done by the Project Manager with assistance from the Programme Manager and other Project Team Members. Once the preliminary schedule was developed, it was reviewed by the Project Team and any resources tentatively assigned to project tasks. The project team and resources must agree to the proposed work package assignments, durations, and schedule. Once this is achieved the Project Sponsor will review and approve the schedule and it will then be baselined. The schedules for the FGP and GISMEPA project are displayed in Appendix 5 and 6 respectively.

4.3.2.6 Control Schedule

This section of the GISMEPA Project Schedule Management Plan defines how

the project's schedule will be controlled throughout the life of the project. This includes the frequency of updates and schedule reviews as well as communicating the schedule and progress. This section also defines roles and responsibilities as they relate specifically to project schedule control.
The project schedule will be reviewed and updated as necessary on a bi-weekly basis with actual start, actual finish, and completion percentages which will be provided by tasks owners. The Project Manager is responsible for holding bi-weekly schedule updates or reviews; determining impacts of schedule variances; submitting schedule change requests; and reporting schedule status in accordance with the Project Communications Plan.

The Project Team is responsible for participating in bi-weekly schedule updates and/or reviews; communicating any changes to actual start and/or finish dates to the Project Manager; and participating in schedule variance resolution activities as needed. The Project Sponsor will be updated and kept aware of the project schedule status and will review or approve any schedule change requests submitted by the Project Manager.

4.3.2.6.1 Schedule Changes and Tolerances

As the project schedule is created it is important that boundary conditions are set by the Project Sponsor to establish the schedule parameters within which the project is expected to operate. Any event which may potentially cause a schedule change which exceeds these boundary conditions must have a schedule change request submitted and approved by the Sponsor before the schedule change is implemented. If any member of the Project Team determines that a change to the schedule is necessary, the project manager and team will meet to review and evaluate the change. The Project Manager and Project Team must determine which tasks will be impacted, the variance as a result of the potential change, and any alternatives or variance resolution activities that may need to be

employed to determine how they would affect the scope, schedule, and resources.

If the Project Manager determines that the evaluation has uncovered any change that will exceed the established boundary conditions, then a schedule change request must be submitted. This request should be sent via the GISMEPA Change Request Form to the Project Manager and ultimately to the Sponsor for review and/or approval. Submission of a schedule change request to the Project Sponsor must meet the following two threshold conditions:

1. The proposed change is estimated to reduce the duration of an individual work package by 10% or more, or increase the duration of an individual work package by 10% or more.
2. The proposed change is estimated to reduce the duration of the overall baseline schedule by 10% or more, or increase the duration of the overall baseline schedule by 10% or more.

Any change requests that do not meet these thresholds may be submitted to the Project Manager for approval. Once the change request has been reviewed and approved. the Project Manager is responsible for adjusting the schedule and communicating all changes and impacts to the Project Team, Project Sponsor, and Stakeholders. The Project Manager must also ensure that all change requests are archived in the project records.

4.3.2.6.2 Scope Change

Occasionally, approved changes to the project's scope may result in the schedule needing to be re-baselined. These scope changes may include new deliverables or requirements that were not previously considered as part of the original schedule development. In these situations the Project Manager and team must consider the current status of the project schedule and how the scope change will affect the schedule and its resources as the project moves forward. Any changes in the project scope, which have been approved by the Project

sponsor, will require the project team to evaluate the effect of the scope change on the current schedule. If the Project Manager determines that the scope change will significantly affect the current project schedule, then a request for re-baselining the schedule should be considered for any changes which need to be made as part of the new project scope. The Project Sponsor must review and approve this request before the schedule can be re-baselined.

4.3.3 Schedule Management Approach

The GISMEPA Project schedule was created using WBStool® starting with the deliverables identified in the project's WBS. An activity list was developed to itemize the activities in each work package. Activity definition identified the specific work package which must be performed to complete each deliverable.
Schedule related matters should be identified, assessed, recorded, prioritized, approved or rejected then published as necessary for project success realization. All project activities were defined and scheduled to allow for the timely realization of project objectives during the pre-approved timeline. Once created, the schedule included activity tracking and schedule progress reporting templates. The project was then monitored and changes were controlled once the schedule baseline was established.

This Schedule Management Plan for the GISMEPA Project covers activities spanning a 60 day period (60 days are required to recruit the GIS Consultant to map Ebony Park Agro Park and complete the creation of Maps for the Park). Start date for project is slated for December 11, 2017 and end date February 8, 2018.The FGP schedule (Appendix 5) was developed with sections consisting of five (5) work packages; Recruit GIS Consultant, Map Agro Park, Produce Maps, Adjustments and Final Approval of Maps. Each deliverable was further decomposed into respective activities to allow for the completion and realization of each deliverable. The time allotted for each schedule component was directly

correlated to the level of detail needed for each project deliverable and some activities were scheduled simultaneously dependent on the nature of the work.
The preliminary schedule that was developed by the Project Manager should be reviewed and approved by the Project Sponsor once there is consensus on the proposed action plan and supporting methodology are reached between the Project Manager, Programme Manager and the Project Sponsor. WBStool® was the Scheduling tool software that was used to develop and present the schedule. The first (1st) level of the WBS is identified for the creation of the Activity Accounts. At this level to the schedule can be tracked. Time allotments are rounded to the nearest whole hour.

The percentage of credit granted to each work package will be calculated based on the amount of work completed at a point in time compared to the total time required to complete the work package. Schedule components will be adjusted in response to matters that may affect the timely completion of the proposed project deliverables. These change requests and newly proposed due dates are to be communicated to the Project Sponsor for review and approval. Approved extension periods are to be reflected in the schedule.
The designated milestones for the GISMEPA Project is displayed in Chart 14 below. Appendix 8 displays the designated milestone list for the FGP Project schedule.

Chart 14. GISMEPA Milestone List.

ID	Name	Description	Date	Type		
0	Project Kick-off	Meeting to start project kick-off.	11-12-2017	Internal	Final	Mandatory
5	Signed GIS Consultant Contract	Once the terms of the contract have been explained to the selected candidate and are accepted, it should be signed by the GIS Consultant, the Programme Manager and the Sponsor.	2-1-2018	Internal	Final	Mandatory
10	Verify Mapping (GPS) Data	The GIS Consultant, Project Manager and Compliance Manager should conduct a site visit to do a final mapping exercise to verify that the GPS data for all plots, structure, road and irrigation works are captured.	13-01-2018	External	Final	Mandatory
14	Inspected Trial Map	The GIS Consultant should print a third map (Trial map 3) at a scale of 1:15000 including all updated GPS data. This map should be inspected by the Compliance Manager, Project Manager and the MICAE QC Personnel using the requirements set out	21-01-2018	Internal	Final	Mandatory
17	Final Mock Audit Report	The Project Manager and the Compliance Manager should conduct a final mock audit using a checklist (prepared by the GIS Consultant) consisting of the list of farmers plot, structures, roads and irrigation works and the adjustedTrial Map 3. A report containing the result of the audit should be prepared by the Compliance Manager and submit to the Project Manager.	01-02-2018	Internal	Final	Mandatory
21	Complete Printed and Digital Maps	The Project Sponsor approves the maps provided any queries that may arise are resolved.	08-02-2018	External	Final	Mandatory

4.3.4 Schedule Management Roles and Responsibilities

The Roles and responsibilities for schedule development on the GISMEPA Project are as follows:

Chart 15. GISMEPA Project Schedule Management Roles and Responsibilities.

PROJECT ROLE	RESPONSIBILITY
Project Sponsor	• Participate in reviews of the proposed schedule. • Approve the final schedule before it is baselined.
Programme Manager	• Participate in reviews of the proposed schedule. • Obtain schedule approval from the Project Sponsor.
Project Manager	• Facilitate work package definition, sequencing, and estimating duration and resources with the project team. • Create the project schedule using WBStool®. • Obtain schedule approval from the Project Sponsor. • Validate the schedule with the Project Team, Stakeholders, and the Project Sponsor.
Project Team	• Participate in work package definition, sequencing, and duration and resource estimating. • Review and validate the proposed schedule and perform assigned activities once the schedule is approved.
Project Stakeholders	• Participate in reviews of the proposed schedule and assist in its validation.

4.3.5 Schedule Management Reporting

Schedule Management reporting on the GISMEPA Project should be vertical and horizontal. Decisions should be passed down from Sponsor to Programme Manager to the Project Manager. These decisions should then be communicated laterally to the project team members. All reporting protocol is detailed in a Communication Management Plan (not developed in this study) to ensure that the communications needs of all stakeholders are met and that they are engaged.

Reporting for Schedule Management will be included in the monthly project status report. The Monthly Project Status Report will include a section labeled, “Schedule Management”. This section will contain the schedule baseline identified in this plan. All schedule requirements identified in this Schedule Management Plan will be reported on including any deviations and corrective actions which are planned. Change requests which are triggered based upon project schedule issues will be identified and tracked in this report.

COST MANAGEMENT PLAN

PROJECT MANAGEMENT PLAN FOR THE GIS MAPPING OF EBONY PARK AGRO PARK(GISMEPA) PROJECT

DATE:

VERSION #:	**REVISION DATE:**
PREPARED BY:	**APPROVED BY:**

4.4. COST MANAGEMENT PLAN

4.4.1. Introduction

The Cost Management Plan will clearly define how the costs on the GISMEPA projectwill be managed throughout the project's life cycle. The Project Manager will be responsible for managing and reporting on the project's cost throughout the duration of the project. During the monthly project status meeting, the Project Manager will meet with management to present and review the project's cost performance for the preceding month. Performance will be measured using earned value. The Project Manager is responsible for accounting for cost deviations and presenting the Project Sponsor with options for getting the project back on budget. The Project Sponsor has the authority to make changes to the project to bring it back within budget.

4.4.1.1 Use of the Cost Management Plan

The approved Cost Management Plan for the GISMEPA Project receives a version number; the first being 001 and an issue date. The issue date never changes. Once there has been an approved update to this Cost Management Plan the updated version should be given a version number and the revision date recorded. A change to this Cost Management Plan is the responsibility of the Project Manager or designee.

4.4.2 Processes

The processes of Project Cost Management are:

- Plan Cost Management
- Estimate Costs
- Determine Budget
- Control Cost

4.4.3. Cost Management Approach

GISMEPA project is explained. The third level of the WBS is selected to create the Cost Accounts (CA). This is done at this level to track costs especially during the creation of the maps .

For the GISMEPA project, planning cost management will be done using weekly meetings for the engagement of various combinations of stakeholders in cost planning and must involve the key personnel from the Accounts Department of MICAF as well as the Chief Financial Officer for ACP. Estimating cost will be done using expert judgement and bottom-up estimating through the analysis and application of organization process assets used over time by the Accounts Department of the MICAF and accounting guidelines set out by the IDB. The budget will be determined using cost aggregation, reserve analysis and expert judgement; and cost will be controlled through the use of earn value management and reserve analysis techniques. Costs for this project will be managed at the third level of the WBS.

4.4.3.1 Measuring Project Costs

This Cost Management Plan will define how the project's costs will be measured. Earned Value Management (EVM) as described in the PMBOK® will be used to measure and control cost for the GISMEPA Project.The four EVM tools that will be used to measure and control cost for this project are: Schedule Variance (SV), Cost Variance (CV), Schedule Performance Index (SPI) and Cost Performance Index (CPI). SV is a measurement of the schedule performance for a project. Schedule performance is calculated as follows:

SV=EV-PV

Where PV is Planned Value; the project plan should have earned at this point, and EV, Earned Value is the actual value earned.

This calculation gives a good measure of whether the project is ahead or behind the baseline schedule. If SV is zero, then the project is exactly on schedule. If

SV is greater than zero, the project is earning more value than planned therefore, it is ahead of schedule. The project is considered to be behind schedule if the SV is less than zero and is therefore earning less value than planned.

Cost Variance (CV) is a measurement of the budget performance for a project.

CV is calculated as follows:

$$CV = EV - AC$$

Where AC is the actual costs the project has incurred to date. Therefore, calculating CV gives a good measure of whether the project is above or below budget. If CV is zero, then the project is perfectly on budget. If CV is greater than zero, the project is earning more value than planned and is therefore under budget. If CV is less than zero, the project is earning less value than planned therefore it is over budget.Schedule Performance Index (SPI) measures the

$$SPI = EV/PV.$$

If EV is equal to PV the value of the SPI is one. If EV is less than the PV then the value is less than 1, which means the project is behind schedule. If EV is greater than the PV the value of the SPI is greater than one, which means the project is ahead of schedule. The GISMEPA project will be considered a well performing project if the SPI is close to one as possible, or a little less than one.

Cost Performance Index (CPI) measures the value of the work completed compared to the actual cost of the work completed. CPI is calculated as follows:

$$CPI = EV/AC.$$

If CPI is equal to one the project is perfectly on budget. If the CPI is greater than one the project is under budget, if it's less than 1 the project is over budget.

If the SPI or CPI has a variance of between 0.1 and 0.2, the Project Manager must report the reason for this. If the SPI or CPI has a variance of greater than 0.2, the Project Manager is to submit a corrective action report indicating the possible triggers and the appropriate responses should be submitted to the Sponsor within 3 days of the variation. This is done to seek formal approval of any possible changes to the project's budget.

4.4.3.2 Estimating Cost

Earned Value calculations for the CA's will measure and manage the financial performance of the project. Although activity cost estimates are detailed in the work packages, the level of accuracy for cost management is at the third level of the WBS. Costs were rounded to the nearest dollar and work hours rounded to the nearest whole hour.

The cost estimate for the GISMEPA Project included a contingency reserve calculated at 2%,5%, 5% and 5% of the items in the Cost Account. Expert judgement was used to identify the percentage allocated for the contingency reserve. The decision was made to calculate the contingency at the low end of the range, as a result of the number of known-unknowns that were identified in the Project Charter and Risk Management Plan. Microsoft Excel 2016 was used to calculate the estimated project costs. The Activity Cost Estimates are displayed in Figure 17 below.

Activity Cost Estimates

WBS No.	Resource	Direct Costs	Indirect Costs	Reserve (Contingency	Estimate	Method	Assumptions/ Constraints	Additional	Range	Confidence Level
1.1	Component 2 Co-ordinator for 16 hours	$0	16 hrs. @ $2,291 = $36,667		$36,700	Historical Payroll data	Work done as Component 2 Coordinator regular work duties	N/A	$36,600 $36,700	High
1.1.1	Programme Manager Bearer for 1 hour	$0 1 hr. @$800	$0		$800	Historical Payroll data	Work done as Programm Manager regular work duties		$800 – $1000	High
1.1.1.1	Component 2 Co-ordinator for 1 hr.	$0	1 hr. @$2,291 =$2,291		$2,291	Historical payroll data				High

	Programme Manager Project Manager Compliance Manager	$0 8 hrs. @ $1,389 = 11,111 $0	$0 8 hrs. @$1,958 =$15,66		$11,111 $15,667	Historical payroll data				High
1.3	Component 2 Co-ordinator for 24 hrs. Programme Manager to review contract	$0	24 hrs. @$2,291 =$54,984		$54, 984	Historical payroll data	Work done as Component 2 Coordinator regular work duties			High
1.3.1	Programme Manager GIS Consultant Labour for 480 hrs. Lease equipment Transportation Calibrate equipment Print maps	$0 480 hrs. @3,236 = $1,553,400 60 days @ $833= $50,000 2 months travellnig allowance @ $56, 000= 112,000	$0 $0 2@ $15,000= $30,000 6@ $9,100= $54,600 $3@9,100= $27,300	2% 2%*1,553,400= $31,068 5% 5%*$30,000 = $1,500 5% 5%*$54,600 = $2,730 5%*$27,300 = $1,365	$1,584,468 $31,500 $57,330 $28,665 $50,000 $112,000	Three Point Estimating Three quotes from GIS Services using the cheapest as a reference Standard Jamaican Government Travelling Allowance rate. Standard Metrology Laboratory rate Analogous Estimating	Work done as Programme Manager regular work duties The GIS Consultant Is responsible for providing calibrated equipment for mapping and creation of map at a scale of 1:15000. Consultant is Also Responsible for cost of printing 6 maps as per contract. The project will pay labour and travelling allowance to the Consultant. Cost for 3 printed trial maps are the responsibility of the GIS Consultant			High

2.1	GIS Consultant for 40 hrs.	40 hrs.@ $3,236= $129,450	1@$14,000= $14,000 for1 Week Travelling Allowance		$129,450					High
2.1.1	GIS Consultant for 8 hrs.	8 hrs. @ $3,236= $25,888	1@$2,000=$2,00f for 1 day Travelling Allowance		$25,888					High
2.1.1.1	GIS Consultant for 40 hrs.	40 hrs.@ $3,236= $129,450	1@$14,000= $14,000 for 1 week travelling allowance		$129,450					High
2.1.1.1.1	GIS Consultant for 40 hrs.	40 hrs.@ $3,236= $129,450	1@$14,000= $14,000 for 1 week travelling allowance		$129,450					High
2.2	GIS Consultant for 40 hrs.	40 hrs.@ $3,236= $129,450	1@$14,000= $14,000 for 1 week travelling allowance		$129,450					High
3.1	GIS Consultant for 40 hrs.	40 hrs.@ $3,236= $129,450	1@$14,000= $14,000 for 1 Week Travelling Allowance		$129,450					High
3.1.1	GIS Consultant For 8 hrs. Compliance Manager for 8 hrs. Project Manager for 8 hrs. MICAF QC	1@$3,236= $3,236 8hrs@$2601= $20,814 8 hrs. @ $13,89 = 11,111 $2,500 Lunch And transportation	$2,000 for 1 day Travelling allowance.			Historical Payroll data Historical Payroll data	QC will be released to perform duties	Mileage, Upkeep and other allowances Lunch and Transportation provided for QC Personnel		High
3.1.1.1	GIS Consultant Compliance Manager Project Manager MICAF QC	1@$3,236= $3,236 8hrs@$2601= $20,814 8 hrs. @ $13,89 = 11,111 $2,500	$2,000 for 1 day travelling allowance. Lunch and Transportation			Historical Payroll data Historical Payroll data	QC will be released to perform duties	Mileage, upkeep and other allowances Lunch and Transportation provided for QC Personnel		High

3.1.1.1.1	GIS Consultant Compliance Manager Project Manager MICAF QC	1@$3,236= $3,236 8hrs@$2601= $20,814 8 hrs. @ $1,389 = $11,111 $2,500	$2,000 for 1 day Travelling allowance. Lunch and transportation		$5,236 =$20,814 $11,111 $2,500	Historical Payroll data Historica Payroll data	QC will be released to perform duties	Mileage, upkeep and other allowances Lunch and Transportation provided for QC Personnel		High
4.1.1	Compliance Manager Project Manager	8hrs@$2601= $20,814 8 hrs. @ $1,389 = $11,111			$11,111	Historical Payroll data Historical Payroll data		Mileage, upkeep and other allowances		High
4.1.1.1	Compliance Manager Project Manager	8hrs@$2601= $20,814 8 hrs. @ $1,389 = $11,111			$20,814 $11,111	Historical Payroll data Historica Payroll data		Mileage, Upkeep and other allowances		High
4.1.1.1.1	Compliance Manager Project Manager for 8 hrs.	8hrs@$2601= $20,814 8 hrs. @ $1,389 = $11,111			$20,814 $11,111	Historical Payroll data Historical Payroll data				High
5	Pogramme Manager for 8 hrs. Project Manager for 8 hrs. Sponsor for 8hrs.	$0 8 hrs. @ $1,389 = $11,111 $0 1@$15,000= $15,000			$11,111 $15,000	Historical payroll data Caterer' invoice				High
5.1	Sponsor for 24 hrs.	$0						2 -3 days for approval.		High

Figure 17. GISMEPA Cost Estimates.

4.4.3.3 Determining the Project Budget

The costs for the GISMEPA Project were estimated after developing the schedule. The tools and techniques used were expert judgement, bottom-up, and analogous estimating, and reserve analysis.The GISMEPA project has one control account that will be contracted out to the GIS Consultant. The estimator ended up using three techniques to develop the estimate, and indicated the accuracy ranges of the control account based on the risk assessment of each item. The estimated control account items were classified into high (-15% to +15%), medium (-10% to +10%), and low (-5% to +5%) risk items.

The high risk items were estimated based on the expert assessment of ACPC FO. The medium risk items were estimated based on historical information and were typically based on a percentage of the total project capital, or based on a unit rate (e.g., salary rate per hour). Low risk items were estimated from quotations received from sub-contractors, which were based on detailed scope statement.

Meetings were conducted with the ACP CFO, the expert, to determine the most effective means of estimating the budget for the project. The Project Manager was advised to estimate the costs for each component of work (bottom-up estimating) using Microsoft Excel In order to determine the cost of each work package. Costs were estimated for each related task required to complete the components of work identified during activity definition. Three quotes were requested for some services where possible and the lowest quote used in determining the budget within a 90% confidence level provided the project is completed within 60 days.

Using the information from the Activity Costs Estimates, Scope Baseline, Cost Management Plan, Project Schedule, Risk Register, the budget was determined by aggregating the costs of each work package. During this process, expert judgement was used along with funding limit provided by the Project Sponsor to ensure that the planned expenditure did not exceed the funds committed to the

project by the Project Sponsor. Microsoft Word 2016 was used to present the information.

The budget for this project is detailed below. Costs for this project are presented in various categories. These are:

Fixed Costs: J$ 666,667 representing the Project Manager's salary.

Contractor Costs: J$1,766,100 representing the GIS Consultant costs.

Contingency Reserve$36,663.00 representing the probable cost of completing the cost account

Management Reserve: J$ 150,000.00 representing IDB standard reserve for small projects (<$J3,000,000) similar to the GISMEPA Project.

Total Project Cost=Cost estimates+Contingency Reserve+Management Reserve =J$2,929,653.84

The Cost Baseline is shown in Chart 16 below:

Chart 16. Cost Baseline.

WBS Activity	Expense	Quantity	Unit Cost (JD$)	Total Cost (JD$)	Purpose
Draft TOR for GIS Consultant	Component 2 Co-ordinator	1	2,291	36,667	Salary and allowances
Advertise Job	Component 2 Co-ordinator	1	2,291	54,984	Salary and allowances Traansportation
Conduct Interviews					
Prepare Contract					
Sign Contract					
Retrieve Available Gis Information	GIS Consultant	1	56,000	112,000	Equipment Calibration
Site Visit			15,000	30,000	Labour and Equipment Lease
Pre-Mapping Of Agro Park			776,700	1,553,400	Print 9 Maps
Adjustments			9,100	81,900	Print 9 Maps Mileage, upkeep and allowances
Verify Mapping Data					
Produce Trial Maps					

Trial Map 1 And Initial Inspection	Compliance Manager	1	83,256.67	166,624.18	Transportation and Lunch
Trial Map 2 And Initial Inspection	MICAF QC	1	2,500	5,000	Salary and allowances
Trial Map 3 And Initial Inspection	Project Manager	1	333,333.33	666,666.66	
Mock Audit 1 Using Adjusted Trial Map 1 Mock Audit 2 Using Adjusted Trial Map 2 Mock Audit 3 Using Adjusted Trial Map 3	GIS Consultant	1			Make adjustments to deliverables
Folow-Up Mock Audit Using Adjusted Trial Maps 1,2 and 3					
Present Maps To Project Sponsor	GIS Consultant	1	3,236	25,888	Sign-off on deliverables
	Programme Manager	1	0	0	
	Project Manager	1	1,389	11,111	
Present Maps To Project Sponsor Final Approval Of Maps	Sponsor	1	0	0	
Miscellaneous	Purchase Software	2	11,000 31,000	42,000	Purchase WBStool® Purchase MS Projec
	Meetings	6	15,000	90,000	Meetings with expert judgement.
	Contingency	2% 5% 5%	2%*1,553,400 5%*$30,000 5%*$81,900	31,068 1,500 4,095 36,663	2%, 5% 5%and 5% of each of the control account ítems GIS Consultant's fee Equipment calibration Print 9 maps
	Management Reserve	1	150.000	150,000	IDB standard management reserve for projects < J$3,000,000

	Subtottal= 2,742,990.84	
	Grand Total=Subtotal+Contingency+ Management Reserve **=2,742,990.84+36,663+150,000 = =$2,929,653.84**	This represents the baseline budget.

4.4.3.4 Cost Variance Reporting and Response Process

This section of the GISMEPA Project Cost Management Plan defines the control thresholds for the project and what actions will be taken if the project triggers a control threshold. As a part of the response process, the Project Manager will present options for corrective action to the Project Sponsor who will then approve an appropriate action in order to bring the project back on budget. The Project Manager may propose to increase the budget for the project, reduce scope or quality, or some other corrective action.

The Control Thresholds for this project is a CPI or SPI of less than 0.8 or greater than 1.2. If the project reaches one of these control thresholds; a Cost Variance Corrective Action Plan is required. The Project Manager will present the Project Sponsor and Programme Manager with options for corrective actions within five business days from when the cost variance is first reported. The Cost Variance Corrective Action Plan will detail the actions necessary to bring the project back within budget and the actions to be taken to measure the effectiveness of the actions. Upon acceptance of the Cost Variance Corrective Action Plan, it will become a part of the project plan and the project will be updated to reflect the corrective actions.

Cost variances of +/- 0.1 in the cost and schedule performance indexes will change the status of the cost to cautionary; as such, those values will be changed to yellow in the project status reports. Cost variances of +/- 0.2 in the cost and schedule performance indexes will change the status of the cost to an alert stage; as such, those values will be changed to red in the project status reports. This will require corrective action from the Project Manager in order to bring the cost and/or schedule performance indexes below the alert level.

Corrective actions will require a project change request requiring approval by the Project Sponsor before it can be included within the scope of the project.

4.4.3.5 Cost Change Control Process

The change control process follows the project change control process (section 4). The cost change control process will follow the established project change request process. The cost change request should be reported to the Project Manager using the Project Change Request Form (Appendix 14). The request is then reviewed by the Project Manager and Programme Manager. A report is then sent to the IDB by the Programme Manager for approval. The turn around time for this process should be no more than 5 working days. Special cost/budget change request that will not require re-baselining the cost requires that a request be sent to the Programme Manager by the Project Manager and this request can be approved or denied by the Programme Manager with no or limited reporting to the Sponsor.

4.4.4 Cost Management Roles and Responsibilities

The role and responsibilities of the persons involved in cost management are

displayed in Chart 19 below:

Chart 19. GISMEPA Cost Management Roles and Responsibilities.

Role	Responsibilities
Project Sponsor IDB	Approve cost changes.
Programme Manager	Apply for fundingfor project activities from IDB Submit cost change request to IDB Report project performance to Sponsor Review cost change requests with Project Manager and Sponsor.
Project Manager	Report project performance to Programme Manager Measure project performance

	Develop and implement corrective actions. Review and report change requests. Determine budget Estimate costs
Chief Financial Officer (CFO), ACP	Liaise with MICAF Accounts Department to Disburse monies approved by Sponsor
MICAF Accounts Department	Provide expert judgement when determining the GISMEPA budget.

4.4.5 Cost Management Reporting

Cost Management reporting on the GISMEPA Project should be vertical and horizontal. Decisions should be passed down from Sponsor to Programme Manager to the Project Manager. These decisions should then be communicated laterally to the project team members. All reporting protocol is detailed in a Communication Management Plan (not developed in this study) to ensure that the communications needs of all stakeholders are met and that they are engaged. Reporting for cost management will be included in the monthly project status report. The Monthly Project Status Report will include a section labeled, “Cost Management”. This section will contain the Earned Value Metrics identified in the previous section. All cost variances outside of the thresholds identified in this Cost Management Plan will be reported on including any corrective actions which are planned. Change requests which are triggered based upon project cost overruns will be identified and tracked in this report.

QUALITY MANAGEMENT PLAN

PROJECT MANAGEMENT PLAN FOR THE GIS MAPPING OF EBONY PARK AGRO PARK (GISMEPA) PROJECT

DATE:

VERSION #:	**REVISION DATE:**
PREPARED BY:	**APPROVED BY:**

4.5 QUALITY MANAGEMENT PLAN

4.5.1 Introduction

Quality Management Plan for the GISMEPA project will establish the activities, processes, and procedures for ensuring a quality product upon the conclusion of the project. The purpose of this plan is to:

- Ensure quality is planned
- Define how quality will be managed
- Define quality assurance activities
- Define quality control activities
- Define acceptable quality standards

4.5.1.1 Use of the Quality Management Plan

The approved Quality Management Plan for the GISMEPA Project receives a version number, the first being 001 and an issue date. The issue date never changes. Once there has been an approved update to this Quality Management Plan the updated version should be given a version number and the revision date recorded. A change to this Quality Management Plan is the responsibility of the Project Manager or designee.

4.5.2 Processes

The processes of Quality Management are:

- Plan quality management,
- Control quality and
- Perform quality assurance.

Tools and Techniques to be applied for the GIS Mapping of Ebony Park are:

- Inspection,
- Auditing
- Reviewing technical data,
- Reporting

4.5.3 Quality Management Approach

The purpose for managing quality is to validate that the project deliverables are completed with an acceptable level of quality. Quality management assures the quality of the project deliverables and the quality of the processes used to manage and create the deliverables. The Quality Management Plan identifies these key components:

1. Items for Quality Review:
- Project Deliverables
- Project Processes
2. Quality Measure
- Deliverable Quality Standards
- Completeness and Correctness Criteria
- Process Quality Standards
- Stakeholder Expectations
3. Quality Evaluation Methods
- Quality Control Activities
- Quality Assurance Activities

The following is a brief explanation of each of the components of this Quality Management Plan.

• Project Deliverables and Process	The key project deliverables and processes subject to quality review.
• Deliverable Quality Standard	The quality standards that are the measures used to determine a successful outcome for a deliverable.
• Completeness and Correctness	The completeness and correctness criteria describe when each deliverable

Criteria	is complete and correct as defined by the customer. Deliverables are evaluated against these criteria before they are formally approved.
• Process Quality Standards	The quality standards that are the measures used to determine if project work processes are being followed.
• Stakeholder Expectations	Stakeholder expectations describe when a project process is effective as defined by the project stakeholders. An example is the expectation to be regularly informed monthly of project status.
• Quality Control Activities	The quality control activities that monitor and verify that the project deliverables meet defined quality standards.
• Quality Assurance activities	The quality assurance activities that monitor and verify that the processes used to manage and create the deliverables are followed and are effective.

4.5.3.1 GISMEPA Quality Management Objectives

The following are the quality objectives of the GISMEPA Project that reflect the overall intentions to be applied with regard to quality throughout the project:
To produce deliverables to support improved audit process.
To meet the requirements requested by ACP.
To create deliverables using best practices for mapping and map production to prevent re-work and complete the project within contractual baselines.

4.5.3.2 Product Quality:

The project team and quality group will determine the product quality standards and requirements. These standards are based on Jamaican legislation and regulation and the JAD 2001 Map Projections Standards for GIS mapping and map development. The project team will also document any newly identified quality standards into the GISMEPA project plan and ensure communication with all stakeholders.
Use of trial maps as they are produced in mock audits determines their ongoing compliance with the product quality standards. The inclusion of all corrections reported in each mock audit report represents the improvements needed to comply with these requirements. Once the final map meet the quality standards set out in the JAD 2001 Map Projections Standard and the ACP requirements of the hard copy being printed at a scale of 1:15000 and the digital copy done in AutoCAD (representing 100% of the acceptable product quality requirements), this map will be reproduced for the ACP.

4.5.3.3 Process Quality:

The quality policy of MICAF will be used as a standard by which project implementation occur. The policy provides the process and service delivery standard by which products are produced.
The project team and quality group will use a checklist with the approved service delivery standards and procedures to determine the process quality standards and requirements. Though these standards will be based on existing MICAF process standards, some unique steps in the mapping and map development

processes are anticipated. The project team will work with the Quality Department of MICAF to establish acceptable standards and document these standards for incorporation into both organizational process documents as well as the GISMEPA Project plan. These standards should be communicated to all project stakeholders.

Monitor the process quality throughout the project's execution using earned value. The project is considered on quality if the CPI value and SPI values are between 0.8 and 1.2. Triggers of CPI an SPI below 0.8 and above 1.2
should result in a non-conformance report being generated by the Project Manager and sent to the Sponsor within 3 days of the event. A decision on the changes (if any) to be implemented should be communicated to the Programme Manager and filtered to the Project Manager and eventually to all Stakeholders.

4.5.3.4 Quality Assurance

The focus of quality assurance is on the processes used in the project. Quality assurance ensures that project processes are used effectively to produce quality project deliverables. Chart 20 identifies:

- The project processes subject to quality assurance.
- The quality standards and stakeholder expectations for that process.
- The quality assurance activity – such as a quality audit or reviews - that will be executed to monitor that project processes are properly followed.
- How often or when the quality assurance activity will be performed.

Chart 20. GISMEPA Quality Standards and Quality Assurance Activities.

Project Process	Process Quality Standards/ Stakeholder Expectations	Quality Assurance Activity	Frequency/Interval
Develop/refine mapping data	100% compliance with JAD 2001 Map Projections Standard.	Audit mapping data against JAD 2001 Map Projections Standard.	Once per project phase

Produce three trial maps	95% compliance with JAD 2001 Map Projections Standards.	Inspect map quality against JAD 2001 Map Projections Standard and update project documents.	Once per trial map produced.
Make adjustments to trial map	100% compliance with JAD 2001 Map Projections Standards	Inspect map quality against with JAD 2001 Map Projections Standard and update project documents.	Once per adjusted trial map produced.
Produce final map	100% compliance with JAD 2001 Map Projections Standards	Inspect map quality against with JAD 2001 Map Projections Standard and update project documents.	Once per project phase
Submit map for Approval	100% compliance with JAD 2001 Map Projections Standards	Inspect map quality against with JAD 2001 Map Projections Standard and update project documents.	Once per project phase subject to deliverable meeting all quality requirements.

Conduct QA activities by documenting processes, auditing these processes against standard operating procedures using checklists, closing out non-conformities and documenting lessons learned. QA activities should be documented in logs and register shown in Appendix 9 and Appendix 10 respectively.

4.5.3.5 Quality Control

The focus of quality control is on the deliverables of the project. Quality control monitors project deliverables to verify that the deliverables are of acceptable quality and are complete and correct. The QC activities for the GISMEPA Project will focus on identifying deficiencies in the actual maps produced. QC Inspections shall be conducted as a three-phase control process to include:

1. Initial inspection
2. Follow-up inspection
3. Final inspection

Preparatory meetings will precede these control phases. Carry out these inspections and meeting for each map version produced regardless of whether the map version is trial or actual.

Implementation of the three-phase control process vouches for compliance with the approved GISMEPA Quality Management Plan specifications and requirements. Each single control phase is important for achieving the required quality, whereas the preparatory meeting and initial inspections are particularly important to make provision against re-works and its effects such as failure cost and delay. Inspection activities are to be included in the QC log as seen in Appendix 9 and Quality Inspection Register in Appendix 10.

Chart 21 below identifies:

- The major deliverables of the project that will be tested for satisfactory quality level.
- The quality standards and the correctness and completeness criteria established for the project deliverable. Included are any organizational standards that need to be followed:
- The quality control activities that will be executed to monitor the quality of the deliverables.
- How often or when the quality control activity will be performed.

Chart 21. GISMEPA Quality Standards and Quality Control Activities.

Project Deliverable	Deliverable Quality Standards/ Completeness and Correctness Criteria	Quality Control Activity	Frequency/Interval
Signed Contract	Aligned with MICAF quality service delivery. (100%)	Scope review Schedule review Cost review	Weekly by topic . Monthly Project Status Meeting
Verified Mapping Data	Meet with best practices for mapping and map production. (95%)	Document, prioritize, publish change control requests. Apply change requests per change control request procedure	Once during mapping phase
Final Trial Map	Meet with best practices and standard requirements for mapping and map production criteria. (95%). Deliverables support improved audit process for GlobalGAP Certification criteria (95%)	Apply change requests per change control request procedure	Once during each map produced.
Final Mock Audit Report	Meet the requirements requested by ACP criteria (95%)	Apply change requests per change control request procedure	Once after final mock audit.
Printed and Digital Maps	Meet the requirements requested by ACP criteria (100%) Deliverables will support improved audit process for GlobalGAP Certification (100%)	Establish and document evaluation criteria Review Team-review deliverable per criteria	Once at deliverable acceptance.

4.5.3.6 Preventive Measures

This Quality Management Plan is intended to be proactive, in order to reduce risks and avoid issues and deficiencies. The tools and techniques identified for this project in order to meet this target include (but are not limited to)

- Training and qualification,
- Inspections and verifications,
- Management of document or product submission,

- Equipment calibration, certification and maintenance report.

4.5.3.7 Non-Conformance Report (NCR)

Identified insufficient workmanship or poor quality maps or equipment/devices not conforming to the specifications and/or requirements or other non-conformities shall be documented by the GIS Consultant in a Non-Conformance Report. The NCR will be passed to the Project Manager and reviewed by the Compliance Manager. The NCR should tell what are the non-conformances, root cause analysis and proposed resolution. As a deficiency is corrected, a Corrective Action Report (CAR) shall be filled out by the Project Manager and shall be passed to the document controller for registration and further distribution to the Compliance Manager or designee.

The NCR remains open until the non-conformance is satisfactorily resolved, inspected and approved by the Compliance Manager or designee and the Project Manager or ACP's representative. Each NCR shall be evaluated concerning process improvement by the Compliance Manager or designee and should be entered into MICAF's repository of lessons learned.

Refer to and adhere to the change control procedure documented in section 4 should there be a change request related to the quality requirements of this project.

4.5.3.8 Laws, Regulations and Standards

Strict adherence to this plan in no way absolves any party from any obligations or responsibilities under applicable laws, regulations and standards.

The laws and regulations applicable to this project and relevant to quality management are defined in the contract and include:

- Registration of Titles, Cadastral Mapping and Tenure Clarification Legislation 2007, Jamaica
- JAD 2001 Map Projection Standard
- MICAF Quality Policy

4.5.4 Quality Management Roles and Responsibilities

The quality roles and responsibilities for the GISMEPA Project are shown in Chart 22 below:

Chart 22. GISMEPA Project Quality Roles and Responsibilities.

Project Quality Role	Responsibilities		
	Quality Control	**Quality Assurance**	**Document Control**
Project Sponsor	Approves/denies change requests related to quality		
Programme Manager	Liaise wit Sponsor on quality issues and change requests		
Project Manager	Inspects ongoing results of activities Produces checklists, forms and records	Reviews product submittals and method statements Verifies compliance with quality criteria Evaluates inspection records Identifies training needs Evaluates project records	Updates project records and registers. Compiles the quality file Distributes documents to other departments
Compliance Manager	Verifies compliance with methodologies	Audits project Procedures	
GIS Consultant	Produce deliverables that meet requirements Use calibrated Equipment		
MICAF QC Staff		Evaluates project records for lessons learned	Receives and registers relevant documents

4.5.5 Quality Management Reporting

Quality Management reporting on the GISMEPA Project should be vertical and horizontal. Decisions should be passed down from Sponsor to Programme Manager to the Project Manager. These decisions should then be communicated laterally to the project team members. All reporting protocol is detailed in a Communication Management Plan (not developed in this study) to ensure that the communications needs of all stakeholders are met and that they are engaged.

Reporting for Quality Management will be included in the monthly project status report. The Monthly Project Status Report will include a section labeled, “Quality Management”. This section will contain the quality standards and requirements identified in this plan. All quality requirements and standards identified in this Quality Management Plan will be reported on including any non-conformances and corrective actions that are planned. Change requests that are triggered based upon project quality issues will be identified and tracked in this report.

RISK MANAGEMENT PLAN

PROJECT MANAGEMENT PLAN FOR THE GIS MAPPING OF EBONY PARK AGRO PARK (GISMEPA) PROJECT

DATE:

VERSION #:	**REVISION DATE:**
PREPARED BY:	**APPROVED BY:**

4.6 RISK MANAGEMENT PLAN

4.6.1 Introduction

This plan documents the approach, processes, tools and techniques, and roles and responsibilities, which will be used to manage and control those events that could have a negative impact on the GISMEPA Project. It is the controlling document for managing and controlling all project risks.

Risk planning is usually the last project management process completed during the planning phase of a project, as the overall plan and scope are needed to find out where risk management tasks can be allocated. This plan will address:

- Risk Identification,
- Risk Assessment,
- Risk Mitigation,
- Risk Response Planning,
- Risk Contingency Planning and
- Risk Tracking and Reporting

A risk is any event that could prevent the project from progressing as planned, or from successful completion. Risks can be identified from a number of different sources. High level risks along with constraints and assumptions were identified for the FGP in the Project Charter.

According to the PMBOK® (PMI, 2013), the development of the risk management inputs to developing the Risk Management Plan are the OPA, the Project Management Plan, EEF, the Project Charter and the Stakeholder Register (not developed in this study).

4.6.1.1 Use of the Risk Management Plan

The approved Risk Management Plan for the GISMEPA Project receives a version number, the first being 001 and an issue date. The issue date never changes. Once there has been an approved update to this Risk Management Plan, give the updated version a version number and the revision date recorded.

A change to this Risk Management Plan is the responsibility of the Project Manager or designee.

4.6.2 Processes

4.6.2.1 Plan Risk Management

Inputs

1. Project Management Plan - needed for the performance baseline in the areas of scope, time, quality and cost of the GISMEPA Project that may all be affected by risk-related activities.
2. Project Charter-Contains high-level risks, high-level project descriptions, and high-level requirements used in planning risk management.
3. Stakeholder Register-Will provide an overview of the risk roles of the various stakeholders on the project.
4. EEFs- EEFs include but may not be limited to risk attitudes, thresholds, and tolerances of the organization.
5. OPAs-include but may not be limited to risk categories, definitions, risk statement formulas, templates, risk-related roles and responsibilities, authority levels for risk-related decision making and lessons learned.

4.6.2.1.1Tools & Techniques

1. Analytical Techniques- to understand and define the overall risk management context of the project, based on a combination of the stakeholder risk attitudes and strategic risk exposure of the project.
2. Expert judgment-expertise considered from subject matter experts, project stakeholders, and senior management and lessons learned from previous projects.
3. Meetings- used to develop the risk management plan.

4.6.2.1.2 Output

Risk Management Plan- describes planning and execution of risk management activities.

4.6.2.2 Identify Risk

This process determines which risks may affect the GISMEPA Project Objectives and documents their characteristics. Details of risk identification are developed in the Risk Management Approach section of this plan.

4.6.2.2.1Tools and Techniques

The tools and techniques to this process are:

1. Documentation reviews- MICAF and IDB OPAs concerning risk management used to determine the approach to identifying risks.
2. Information gathering interviews- Meetings provide Stakeholders' inputs in identifying and categorizing risks.
3. Checklist analysis-analyze risk factors.
4. Assumptions analysis-used to categorize risks based on what is known.
5. Diagramming techniques- Not considered for this project
6. SWOT analysis-Used to determine the potential impact of risks on project objectives.
7. Expert Judgment- meets with MICAF and IDB Risk experts to assist in identifying risks.

4.6.2.2.2 Output

The output of this process is the Risk Register (please see Figure 18 below). The risk register identifies each risk, indicates what impact it would have on the project if the risk were to occur, and identifies potential responses to that risk.

4.6.2.3 Perform Qualitative Risk Analysis

This process involves the prioritizing risks for further analysis by assessing likelihood & impact.

4.6.2.3.1Tools and Techniques

The tools and techniques of this process are:

1. Risk probability and impact assessment-See developed risk assessment in Risk Management Approach section.
2. Probability and impact scaled matrix- See Appendix 12
3. Risk data quality assessment- Not considered for this project.
4. Risk categorization (see the GISMEPA Project Risk Breakdown Structure in Appendix 11)
5. Risk urgency assessment
6. Expert judgment- Hold meetings with MICAF and IDB risk experts to categorize risks on the GISMEPA Project

4.6.2.3.2 Output

The output of this process is Risk Register updates.

4.6.2.4 Perform Quantitative Risk Analysis

This process numerically analyzes the effect of risks on project objectives.

4.6.2.4.1 Tools and Techniques

1. Data gathering and representation techniques
2. Quantitative risk analysis and modeling techniques
3. Expert judgment

Quantitative risk analysis for the GISMEPA Project is displayed in section 4.6.3.5.2.

4.6.2.4.2 Output

The output of this process is Risk Register updates.

4.6.2.5 Plan Risk Responses

This process assists in developing options and actions to enhance opportunities and reduce risk.

4.6.2.5.1 Tools and Techniques

The tools and techniques used to develop this process are:

1. Strategies for negative risks or threats- See risk mitigation planning in the Risk Management Approach section.
2. Strategies for positive risks or opportunities- See risk mitigation planning in the Risk Management Approach section.
3. Contingent response strategies- See contingency planning in the Risk Management Approach section.
4. Expert judgment- Hold meetings with MICAF and IDB risk experts to develop risk responses plan for the GISMEPA Project.

4.6.2.5.2 Outputs

The outputs to this process are:

- Risk register updates
- Risk-related contract decisions
- Project Management Plan updates
- Project documents updates

See risk response planning in the Risk Management Approach section.

4.6.3 Risk Management Approach

4.6.3.1 Risk Identification

The risks prior to the kick-off for the GISMEPA Project will be identified and others will be identified during the project lifecycle. A risk can be identified by anyone associated with the project. Some risk will be inherent to the project itself,

while others will be the result of external influences that are completely outside the control of the project team.

The Project Manager will identify and document known risk factors
during the creation of the Risk Register (please see Figure 18 below). He will also be responsible to assist the Project Team and other Stakeholders with risk identification, and to document the known and potential risks in the Risk Register. Updates to the Risk Register will occur as risk factors change.

The Project Manager will determine if any of the newly identified risk factors or events warrants further evaluation. Those that do should undergo risk quantification and risk response development as appropriate, and the action items should be closed.

At any time during the project, identified risk factors or events must be brought to the attention of the Project Manager using Email or other forms of written communication to document the item. The project manager is responsible for logging the risk to the Risk Register. Notification of a new risk should include the following Risk Register elements:

- Description of the risk factor or event,
- Probability that the event will occur.
- Schedule Impact. The number of hours, days, week that a risk factor could impact the schedule.
- Scope Impact. The impact the risk will have on the objectives of the project.
- Quality Impact. A risk event may result in a reduction in the quality of work or products that are developed.
- Cost Impact. The impact the risk event, if it occurs, is likely to have on the project budget.

No.	RISK	CATEGORY	PROBABILITY	IMPACT	SIGNIFICANCE	RISK SCORE	STRATEGY	RISK RESOLUTION PLAN	IN CHARGE PERSON / TEAM	TIME LIMIT	TRIGGER	PM SIGN
1	Contractural Breach- The GIS Consultant's inability to conduct or complete work resulting in the process of recruiting a new Consultant and causing delays.	COMMERCIAL	4	Critical (B)	Consultant is primarily responsible for producing the deliverable so the scope would be impacted.	4B	Recruit new GIS Consultant	Recruit one of the Consultant that was not selected	Project Manager			
2	Unavailable base maps GPS Information- Unavailability of base maps of Agro Park or GPS mapping data resulting in them being developed from scratch causing delays.	EXTERNAL	4	Medium(C)	Delays caused by mapping the park from scratch	4C	Map Park earlier than planned	Map Park from scratch earlier than planned date	GIS Consultant			
3	Poor Weather condition- Extensive rainfall that prevent mapping activities and field visits being conducted causing delays.	EXTERNAL	3	Medium (C)	Delays because of a short time in which to do the project	3C	Map Park according to forecast	Monitor weather forecast and conduct mapping accordingly	Project Manager			
4	Equipment Failure- Uncalibrated or malfunctioning equipment resulting in mapping data non-compliant with specifications.	COMMERCIAL	4	Critical	.Unable to map Incorrect GPS data	4A	GIS Consultant should provide back-up equipment	Agreement in contract that back-up equipment be provided with valid calibration certificate from approved metrology laboratory.	GIS Consultant			

5	Maps produced are not printed at specified 1:15000 scale, not developed using AutoCad resulting in maps being non-compliant with JAD 2001 Map Projection Standard and client's requirements.	COMMERCIAL	4	Critical	Re-work – increased cost and causes delays	4A		Enforce terms of contract	GIS Consultant Compliance Manger Project Manager			

Figure 18. GISMEPA Project Risk Register.

4.6.3.2 Risk Assessment

Risk assessment is the act of determining the probability that a risk will occur and the impact that event would have, should it occur. This is a "cause and effect" analysis. The "cause" is the event that might occur, while the "effect" is the potential impact to a project, should the event occur.

Assessment of a risk involves two factors. The first factor that will be analyzed is the probability (the measure of certainty) that an event, or risk, will occur. The second factor that will be estimated is the impact on the project. The estimated cost, the duration of the potential delay, the changes in scope and the reduction in quality should be estimated and documented in the risk statement and then measured using standard project management tools such as project plans, the budget and the statement of work.

For each of the impact categories the impact assessment will include consideration of the following areas of impact also:

- Cost –Estimate this impact as a dollar amount that has a direct impact on the project. However, report as additional resources and equipment as required. Regardless of whether there is a direct cost, document the additional resources in the risk statement as part of the mitigation cost.

- Scope – Whenever there is the potential for not completing the final product as originally planned, measure the scope impact.
- Schedule – Estimate schedule impact of a risk event as schedule delays frequently result in cost increases and may reduce scope or quality. Schedule delays may or may not affect the critical path of the project and an associated push out of the end date.
- Performance/Quality – Analyze the impact that a reduction in quality has on the project and place in an impact category.

The risk P-I levels are defined in Chart 25 below

Chart 25. Risk Probability& Impact Levels.

Probability(P) of Occurrences	**Definition**	**Value**	**Impact(I)**	**Definition**	**Level**
Frequently	Occurs frequently Will be continuously experienced unless action is taken to change even	5(81-100%)	Catastrophic	Regulatory/ Compliance violations/issues Inability to validate data Production/ Process delays	A Very High
Likely	Occurs less frequently if process is corrected Issues identified with minimal review activity. Process failures evident at review.	4(61-80%)	Critical	A non-compliance finding resulting in process, or operational degradation	B High
Occasional	Occurs sporadically Potential issues discovered during focused review.	3(41-60%)	Moderate	Production element errors that may pose indirect	C High Medium

				consequences to the operation Findings requiring a Corrective Action Plans	
Seldom	Unlikely to occur Minimal issue identification during focused review	2(21-40%)	Minor	No regulatory action anticipated No compliance impact anticipated Minor errors in completed Company policy & procedures	D Low Medium
Improbable	Highly unlikely to occur	1(0-20%)	Negligible	No regulatory /compliance violation On time production Properly executed communications	E Low

The Probability-Impact matrix for the GISMEPA Project showing the P-I scales matrix is shown in Appendix 12.

4.6.3.3 Risk Response

For each identified risk on the GISMEPA Project, identify a response. This is the responsibility of the Project Team to select a risk response for each risk. The Project Team will need the best possible assessment of the risk and description of the response options in order to select the right response for each risk.

The probability of the risk event occurring and the impacts will be the basis for determining the degree to which the actions to mitigate the risk should be taken. The mitigation strategies to be employed on the GISMEPA Project is to multiply the risk cost times the probability of occurrence (P*Cost=I)

The possible response options considered for this project are:

- Avoidance – Change sections of the scope.
- Transference – Shift the impact of a risk to a third party (in this case the GIS Consultant). This does not eliminate the risk; only the responsibility shifts.
- Mitigation – Take steps to reduce the probability and/or impact of a risk by taking early action.
- Acceptance – Accept that a risk exists. Given the probability of occurrence and the associated impact to the project, take no actions and the cost, schedule, scope, and quality impacts (if the risk event occurs) accepted. This would apply on the GISMEPA Project if the risk were from external sources.
- Deferred – Determine how to address a risk later. Document the results of the risk assessment process in each Risk Statement, summarized in the Risk Register and reported on a monthly basis at the project status meeting.

4.6.3.4 Risk Mitigation

Risk mitigation involves two steps:

1. Identifying the various activities, or steps, to reduce the probability and/or impact of an adverse risk.
2. Creation of a Contingency Plan to deal with the risk should it occur.

Document mitigation activities in the Risk Register, and review on a regular basis. They should include:

- Identification of potential failure points for each risk mitigation solution.

- For each failure point, document the event to indicate that the event or factor has occurred or reached a critical condition.
- For each failure point, provide an alternative for correcting the failure.

4.6.3.5 Risk Contingency Planning

Contingency planning is the act of preparing a plan, or a series of activities, should an adverse risk occur. Having a contingency plan in place forces the project team to think in advance as to a course of action if a risk event takes place. The plan should include:

- Contingency plan tasks (or steps) that can be performed to implement the mitigation strategy.
- The necessary resources such as money, equipment and labour.
- A contingency plan schedule.
- Emergency notification and escalation procedures, if appropriate.
- Contingency plan training materials, if appropriate.
- Review and update contingency plans if necessary.
- Publish the plan(s) and distribute the plan(s) to management and those directly involved in executing the plan(s).

Contingencies are reflected in the project budget, as a line item to cover unexpected expenses. The amount to budget for contingency may be limited to just the high probability risks. This is determined by estimating the cost if a risk occurs, and multiplying it by the probability.

A start trigger is an event that would activate the contingency plan, while a stop trigger is the criteria to resume normal operations. Both should be identified in the Risk Register. Based on trigger events that have been documented during the risk analysis and mitigation processes, the Project Team or Project Manager will have the authority to enact the contingency plan as deemed appropriate. Day-to-day risk mitigation activities will be enacted and directed by the Project

Manager. Contingency plans, once approved by the Project Sponsor and initiated, will be added to the project work plan and be tracked and reported along with all other project activities.

4.6.3.5.1 Processes to Address Immediate Unforeseen Risks

The individual identifying the risk will immediately notify the Project Manager. The Project Manager assesses the risk situation and if required, identifies a mitigating strategy, and assign resources as necessary.

4.6.3.5.2 Risk Analysis

Risk analysis prioritized risks as part of the Perform Qualitative Risk Analysis process. The risk analysis for the GISMEPA Project involved describing the risk and providing probable causes and triggers for each risk. Identifying risk responses and contingency strategies followed. Risk ratings resulted from using a coded 5X5 risk matrix (please see in (Appendix 12). The risk analysis for this project is displayed in Figure 19 below:

Risk 1:Contractural Breach	
Description of risk event:	The GIS Consultant's inability to conduct or complete work resulting in the process of recruiting a new Consultant and causing delays.
Triggers	Missed deliverables deadlines.
Probable Cause:	Insufficient money No or malfunctioning equipment.
Risk response/ Contingency Plan	Transfer Recruit the next in line GIS Consultant from the pool that was interviewed.
Prevention Strategy	Include in contract that Consultant should show proof of account totaling 1 and a half the amount

	of the cost of contract. Present valid calibration records for equipment and most recent maintenance report.
Risk Score 4B	

Risk matrix

PROBABILITY OF OCCURRENCES	VALUE	CATOSTRAPHIC	CRITICAL	MODERATE	MINOR	NEGLIGIBLE
		A	B	C	D	E
Frequently	5	5A	5B	5C	5D	5E
Likely	4	4A	✓ 4B	4C	4D	4E
Occasional	3	3A	3B	3C	3D	3E
Seldom	2	2A	2B	2C	2D	2E
Improbable	1	1A	1B	1C	1D	1E

Risk Levels:

- Risk is Very High for codes 5A, 5B, 5C,
- Risk is High for codes 4A, 4B, 4C, 3A
- Risk is Medium High for codes 5D, 5E, 4D, 3B, 3C, 2A, 2B
- Risk is Medium Low for codes 4D, 4E, 3D, 2C, 1A, 1B
- Risk is Low for codes 3E, 2D, 2E, 1C, 1D, 1E

Risk 2: Unavailable base maps GPS mapping data	
Description of risk event:	Unavailability of base maps of Agro Park or GPS mapping data resulting in them being developed from scratch causing delays.
Triggers	No base maps or GPS mapping data found from databases searched.
Probable Cause:	Agro Park was never mapped before. Mapping data not available for distribution.
Risk response/ Contingency Plan	Mitigate Develop mapping data from start.
Prevention Strategy	External risk however, Delays can be caused by mapping the park from start so reduce the scheduled mapping time.
Risk Score 4C	

Risk matrix

PROBABILITY OF OCCURRENCES	VALUE	CATOSTRAPHIC	CRITICAL	MODERATE	MINOR	NEGLIGIBLE
		A	B	C	D	E
Frequently	5	5A	5B	5C	5D	5E
Likely	4	4A	4B	✓ 4C	4D	4E
Occasional	3	3A	3B	3C	3D	3E
Seldom	2	2A	2B	2C	2D	2E
Improbable	1	1A	1B	1C	1D	1E

Risk Levels:

- Risk is Very High for codes 5A, 5B, 5C,
- Risk is High for codes 4A, 4B, 4C, 3A
- Risk is Medium High for codes 5D, 5E, 4D, 3B, 3C, 2A, 2B
- Risk is Medium Low for codes 4D, 4E, 3D, 2C, 1A, 1B
- Risk is Low for codes 3E, 2D, 2E, 1C, 1D, 1E

Risk 3:Poor weather condition	
Description of risk event:	Extensive rainfall that prevent mapping activities and field visits being conducted causing delays.
Triggers	Extensive rainfall
Probable Cause:	Tropical systems
Risk response/ Contingency Plan	Mitigate Monitor weather forecast and conduct mapping accordingly.
Prevention Strategy	Provide allowance in the schedule when estimating
Risk Score 3C	

Risk matrix

PROBABILITY OF OCCURRENCES	VALUE	CATOSTRAPHIC	CRITICAL	MODERATE	MINOR	NEGLIGIBLE
		A	B	C	D	E
Frequently	5	5A	5B	5C	5D	5E
Likely	4	4A	4B	4C	4D	4E
Occasional	3	3A	3B	✓ 3C	3D	3E
Seldom	2	2A	2B	2C	2D	2E
Improbable	1	1A	1B	1C	1D	1E

Risk Levels:

- Risk is Very High for codes 5A, 5B, 5C,
- Risk is High for codes 4A, 4B, 4C, 3A
- Risk is Medium High for codes 5D, 5E, 4D, 3B, 3C, 2A, 2B
- Risk is Medium Low for codes 4D, 4E, 3D, 2C, 1A, 1B
- Risk is Low for codes 3E, 2D, 2E, 1C, 1D, 1E

Risk 4: Equipment failure	
Description of risk event:	Uncalibrated or malfunctioning equipment resulting in mapping data non-compliant with specifications.
Triggers	Incorrect mapping data, maps produced outside of specifications.
Probable Cause:	Mal-functioning or uncalibrated equipment.
Risk response/ Contingency Plan	Mitigate/Transfer Lease other equipment with cost to the Consultant. Enforce terms of the Consultant's contract
Prevention Strategy	Consultant's contract should include a clause that allows for presenting back-up equipment with accompanying valid calibration certificate and most recent maintenance report.
Risk Score 4A	

Risk matrix

PROBABILITY OF OCCURRENCES	VALUE	CATOSTRAPHIC	CRITICAL	MODERATE	MINOR	NEGLIGIBLE
		A	B	C	D	E
Frequently	5	5A	5B	5C	5D	5E
Likely	4	✓ 4A	4B	4C	4D	4E
Occasional	3	3A	3B	3C	3D	3E
Seldom	2	2A	2B	2C	2D	2E
Improbable	1	1A	1B	1C	1D	1E

Risk Levels:

- Risk is Very High for codes 5A, 5B, 5C,
- Risk is High for codes 4A, 4B, 4C, 3A
- Risk is Medium High for codes 5D, 5E, 4D, 3B, 3C, 2A, 2B
- Risk is Medium Low for codes 4D, 4E, 3D, 2C, 1A, 1B
- Risk is Low for codes 3E, 2D, 2E, 1C, 1D, 1E

Risk 5: Poor map quality	
Description of risk event:	Maps produced are not printed at specified 1:15000 scale, not developed using AutoCad resulting in maps being non-compliant with JAD 2001 Map Projection Standard and client's requirements.
Triggers	Inspections and audits reveal that maps are not printed according to specifications.
Probable Cause:	Faulty equipment Insufficient knowledge and experience Human error
Risk response/ Contingency Plan	Avoid/Transfer Enforce terms of Consultant's contract

Prevention Strategy	Produce more than one map, conduct repeated inspections, document, and implement changes.

Risk Score 4A

Risk matrix

PROBABILITY OF OCCURRENCES	VALUE	CATOSTRAPHIC A	CRITICAL B	MODERATE C	MINOR D	NEGLIGIBLE E
Frequently	5	5A	5B	5C	5D	5E
Likely	4	✓ 4A	4B	4C	4D	4E
Occasional	3	3A	3B	3C	3D	3E
Seldom	2	2A	2B	2C	2D	2E
Improbable	1	1A	1B	1C	1D	1E

Risk Levels:

- Risk is Very High for codes 5A, 5B, 5C,
- Risk is High for codes 4A, 4B, 4C, 3A
- Risk is Medium High for codes 5D, 5E, 4D, 3B, 3C, 2A, 2B
- Risk is Medium Low for codes 4D, 4E, 3D, 2C, 1A, 1B
- Risk is Low for codes 3E, 2D, 2E, 1C, 1D, 1E

Figure 19. GISMEPA Risk Analysis.

4.6.3.5.3 Quantitative Risk Analysis

Meyer (2015) stated, “When used correctly, Quantitative Risk Analyses have the potential to add tremendous value to projects.” The project scope of work is the starting point for the QRA since it explains what must be done and allows the project team to assess what types of risks the project is exposed to.

The WBS and WBS dictionary are developed from the scope of work and form the basis of the qualitative and quantitative project risk assessments.

The GISMEPAP Project WBS contained one control account. Most of the work will be outsourced to one sub-contractor.

The estimated control account items were classified into high (-15% to +15%), medium (-10% to +10%), and low (-5% to +5%) risk items. Management reserve for unidentified risks is $J150,000.

The schedule was developed based on the time estimates from consulting with experts on similar GIS Mapping activities. These experts suggested an estimation accuracy of -10% to +10% for all scheduled activities. This blanket approach was not ideal but was accepted because of the absence of better information. There is anticipation of a maximum of 2 stops that will result in 6 days lost

In the process of uncertainty determination, the risks that apply to the control account are combined to determine the overall uncertainty range. This process combines the risk impact from three sources, namely estimation accuracy, project risks, and systemic risks. Another aspect of range determination is the impact distribution of risks. This is done by selecting a suitable probability distribution to reflect the way in which the value of an estimated variable is expected to behave in the real world. When a probability distribution is selected, an assumption must be made about the behaviour of the variable. It is unlikely that the selected distribution will be an exact fit for the variable, but in most cases an approximation of the distribution is sufficient.

Factors influenced by human decisions, such as duration estimates, seldom have linear probability distributions. The PERT, beta, exponential, and lognormal distributions are good approximations for many types of human behaviour.

The 2 techniques chosen to perform Quantitative Risk Analysis on the GISMEPA Project are PERT triangular distributions, most appropriate where durations and costs are estimated by a person (usually an expert in their field). PERT calculations are conducted below:

CONTROL ACCOUNT	COST($)			FORMULA: E=O+ML+P / 3	SCHEDULE (Days)			FORMUA: E=O+ML+P / 3
	OPTIMISTIC	MOST LIKELY	PESSIMESTIC		OPTIMISTIC	MOST LIKELY	PESSIMESTIC	
Labour and	1,500,000	1,553,40	1, 570,000	1,541,000	54	62	66	61

Equipment Lease		**0**						
Calibrate Equipment	**32000**	**30000**	**35000**	**32,333.33**	**7**	**7**	**10**	8
Print Maps	**80,000**	**81,900**	**83, 500**	81,800	**5**	**7**	**10**	7
	Total			1,655,133				61

The results of the quantitative risk analysis are as follows:

Parameter	**Estimate**	**% of Point Estimate**
Point Estimate (GISMEPA Project)	J$ 1,655,133	100%
Contingency at 90% confidence level (Control account delays)	J$ 36,663	2.21%
Contingency for unidentified risks	J$150,000	9.06%
Total Contingency	**J$186,663**	**11.26%**
Estimate with Contingency	**J$1,841,796**	

Parameter	**Estimate**	**Number of stops**	**% of Point Estimate**
Point Estimate (GISMEPA Project)	61 days	-	100%
Control account contingency (90%)	6 days	2	10%
Contingency for unidentified risks			
Total Duration	**67 days**		

4.6.4 Risk Management Roles and Responsibilities

The responsibilities of key project stakeholders for risk management on the GISMEPA Project are defined and summarized for each project role, in Chart 26 below:

Chart 26. GISMEPA Project Risk Management Role and Responsibilities.

Project Team Role	**Risk Management Responsibilities**
Project Sponsor	• Actively supporting and encouraging the implementation of a formal risk management process on the project. • Setting and monitoring risk thresholds and ensuring these

	are translated into acceptable levels of risk for the project. • Attendance at risk workshops, identification of risks and ownership of risks. • Reviewing risk outputs from the project with the Project Manager to ensure process consistency and effectiveness. • Reviewing risks escalated by the Project Manager which are outside the scope or control of the project or which require input or action from outside the project. • Taking decisions on project strategy in the light of current risk status, to maintain acceptable risk exposure. • Ensuring adequate resources are available to the project to respond appropriately to identified risk. • Releasing "management reserve" funds to the project where justified to deal with exceptional risks. • The regular reporting of risk status to senior management.
Project Manager	• Overall responsibility for the risk management process, to ensure that foreseeable risks (both threats and opportunities) are identified and managed effectively and proactively to maintain an acceptable level of risk exposure for the project. • Determining the acceptable levels of risk for the project by consultation with the Project Sponsor. • Approving the Risk Management Plan prepared by the Risk Champion. • Promoting the risk management process for the project. • Participating in risk workshops, review meetings, identifying, and owning risks. • Approving risk response plans and their associated risk actions prior to implementation. • Applying project contingency funds to deal with identified risks that occur during the project. • Overseeing risk management by contractor. . • The regular reporting of risk status to the Project Sponsor and project's management unit, with recommendations for appropriate strategic decisions and actions to maintain acceptable risk exposure.

	• Highlighting to senior management any identified risks which are outside the scope or control of the project, or which require input or action from outside the project, or where release of “management reserve” funds might be appropriate. • Monitoring the efficiency and effectiveness of the process in conjunction with the Risk Champion.
Risk Champion	• Overall responsibility for overseeing and managing the risk management process on a day-to-day basis. • Preparation of the Risk Management Plan. • Facilitation of risk workshops and risk reviews at which risks will be identified and assessed. • Creation and maintenance of the Risk Register. • Interviewing Risk Owners to determine risk responses. • Responsibility for ensuring the quality of all risk data. • Analyzing data and producing risk reports. • Reviewing progress with Risk Owners of risk responses and their associated actions. • Advising the Project Manager on all matters relating to risk management. • Coaching and mentoring team members and other stakeholders on aspects of risk management.
Risk Owner	• Development of responses to risks in the form of risk actions that they will assign to Action Owners. • Monitoring the progress on risk responses. • Reporting progress on responses to the Risk Champion via the Risk Register.
Action Owner	• Implementing agreed actions to support response strategies. • Reporting progress on actions to the Risk Owner and recommending any other actions needed to manage the risk.
Project Team Member	• Participating actively in the risk process, identifying and managing risks in their area of responsibility. • Providing inputs to the Project Manager for risk reports.

4.6.5 Risk Management Reporting

Risk Management reporting on the GISMEPA Project should be vertical and horizontal. Decisions should be passed down from Sponsor to Programme Manager to the Project Manager. These decisions should then be communicated laterally to the project team members. All reporting protocol is detailed in a Communication Management Plan (not developed in this study) to ensure that the communications needs of all stakeholders are met and that they are engaged.

Reporting for Risk Management will be included in the monthly project status report. The Monthly Project Status Report will include a section labeled, “Risk Management”. This section will contain the identified risks, risk response strategies and risk requirements identified in this plan. All risks identified in this Risk Management Plan will be reported on including any non-conformances and corrective actions that are planned. Change requests which are triggered based upon project risk issues will be identified and tracked in this report.

5. CONCLUSIONS

The conclusions for the development of the Project Management Plan for the GISMEPA Project are as follows:

1. The creation of the Project Management Plan for the GISMEPA Project using descriptive and analytical research methods supported by primary and secondary sources of which the Fifth edition of the PMBOK® Guide was used as the primary guide for the Project Manager and by extension the Project Management Team. The development of the plan partially satisfies the requirement of the General objectives. The use of the Project Charter and five subsidiary plans developed is adequate in conjunction with the PMBOK® Guide Fifth Edition to complete the additional subsidiary plans not developed in this study due to time restrictions. The existence of a Project Management Plan in the repository of the ACP and by extension MICAF provides a template as well as historical information for similar projects that will be undertaken in the future.
2. The Project Charter was developed to produce the deliverable for specific objective one. This deliverable with its high-level definitions, requirements, budget, a named Sponsor and Project Manager describes the GISMEPA Project and lays out a broad framework from which to work. The Project Charter also contained the official authorization for project start and the application of resources to project activities.

   A project charter is very integral for the success of any project and the developed charter for the study also provides a guide for ACP and the parent company MICAF for future projects.
3. Specific objective two required the development of the Scope Management Plan for the GISMEPA Project. This was accomplished by developing the scope management approach using the five planning processes to this knowledge area. These are plan scope management, collect requirements, define scope, create the WBS, validate scope and the one monitoring, and control process control scope. The collect

requirements process is very important because well-documented project requirements ensure that all the work that is to be included in the project are. The Requirements Documentation (Figure 9) and the Requirements Traceability Matrix (Appendix 4) were adequate tools used for this process.

Development of the WBS, another very important tool, and the WBS Dictionary was done in this Scope Management Plan. The WBS contained all the GISMEPA Project work decomposed top-down into work packages. This represents a critical activity on any project because from the WBS, the project's schedule can be made, the budget developed and resources assigned.

The scope statement developed in this study gives a general outline of all that is required when describing, defining and allocating all the work that should be done on a project and provides a guide for the Sponsor in decision-making process.

4. A project without a realistic time-line is on its way to delays, cost overruns and ultimately failure. With this in mind, a sustainable Schedule Management Plan, the deliverable for specific objective three, was developed for the GISMEPA Project. All activities, their attributes and relationships were defined using the six planning processes: Plan Schedule Management, Define Activities, Sequence Activities, Estimate Activity Resources, Estimate Activity Durations and Develop Schedule in conjunction with the Control Schedule monitoring and control process to plan for the timely completion of the project. Schedule Management is equally important as the Scope Management. In fact, there are direct effects to a project if there are changes to either the scope or schedule. The WBStool® scheduling tool was used to develop the schedule.

   The schedule for the GISMEPA Project was important as the GIS Consultant was provided with a plan in which to complete his tasks and also allowed for the client to evaluate his performance and the overall

performanace of the project. The ACP could use this approach on similar projects.

5. Development of the fifth deliverable, the Cost Management Plan was done using Three Point Estimating and EVM. This satisfied specific objective four. The information required to plan and manage the expending of resources needed for the project were contained in the Cost Baseline and Cost Estimates. The development of the budget in this plan was done using Expert Judgement and presented using Microsoft Excel and Microsoft Word.

   This project was funded by a Sponsor Agency, however the entity that has oversight for the project (ACP) will benefit greatly by planning cost management to expend the funds responsibly. A project done within budget is considered a success and encourages future funding by the Sponsor Agency.

6. To develop the Quality Management Plan, the deliverable from specific objective five, the project's quality management approach, quality requirements, quality assurance and the quality control measures to be employed to bring about continuous improvement that will be used throughout the project. This was to ensure that quality was built into the project's processes and product.

   A Quality Management Plan such as the one developed in this study provides a guide for planning and controlling quality and can be applied across several departments of MICAF even those not directly involved in projects.

7. The final deliverable required by specific objective six, The Risk Management Plan detailed identified risks, risk assessment, risk mitigation, risk contingency and risk response strategies for the GISMEPA Project. The approach detailed in The Risk Management Plan was supported by risk identification, categorization assessment and mitigation. The Risk Register and Probability-Impact Scales were used to plan risk

containment if a threat existed and capitalization if the risk was an opportunity.

Similar to quality management, risk management can be applied across a wide cross-section of departmental processes in MICAF. The Risk Management Plan developed in this study is detailed enough to be used to reduce error and establish standardization of processes on future ACP projects.

8. The overall conclusion is that this Project Management Plan is necessary to complete this phase of GIS Mapping of Ebony Park Agro Park to aid in the next phase of auditing. This plan will provide the systematic guide to complete this phase on time and within budget.

6. RECOMMENDATIONS

The recommendations for the development of the Project Management Plan for the GISMEPA Project are as follows:

1. MICAF needs to establish a formalized project management policy as this Ministry from time to time oversees projects funded by donor agencies such as IDB.
2. IDB should implement a six months period evaluation before granting extensions.
3. Funding agencies should equip project oversight departments with a framework to streamline project governance. This would empower the Director (or Programme Manager with sufficient decision-making power, within protocol, to reduce the turn-around time for decisions and by extension reduce the risk of having delays.
4. IDB in collaboration with MICAF should provide formal training in Project Management especially to members of the Project Co-ordination unit of MICAF and those persons who are responsible for steering projects from the Ministry.
5. ACP should develop, at minimum, a Project Charter for each project they oversee especially if the Sponsor does not present one. This will in essence provide information and consensus on the purpose of a project.
6. ACP should ensure that all requirements for a project or a phase of a project is thoroughly researched using as many subject-area experts. This will prevent or reduce scope creep, delays and cost overruns.
7. The Project Management Plan (or parts thereof) developed during this study should be documented in the ACP project documents repository and used as a template for similar projects in the future.
8. MICAF should establish a document control system for projects to archive lessons learned.

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8. APPENDICES

Appendix 1. FGP Charter.

PROJECT CHARTER	
Date:	**Project Name**
June 26, 2017	Project Management Plan for GIS Mapping of Ebony Park Agro Park Project in Clarendon, Jamaica
Knowledge Areas / Processes	**Applicacion Area (Sector / Activity)**
Knowledge areas: Scope Management Time Management Cost Management Qualiy Management Risk Management Process groups: Initiating Planning	Information Technology in Agriculture
Start date	**Finish date:**
June 26, 2017	November 17, 2017
Project Objectives (general and specific)	
General Objective: To create a project management plan for the GIS mapping of the Ebony Park Agro Park Project in Clarendon, Jamaica to provide a logical and sequential way to plan for similar projects in the future. Specific Objectives: 1. To create a project charter to get official authorization for project start 2. To develop a scope management plan to include all the work that is to be done. 3. To create a schedule management plan to document the activities, their attributes and relationship in the timely completion of the project. 4. To develop a cost management plan to provide the policies and proceduresrequired to plan and manage the expending of resources needed for the project. 5. To develop a quality management plan to identify define the quality requirements of the project and service and meet organizational quality policy. 6. To develop a risk management plan to document the categorization of	

identified risks, responsible risk owners, possible response to them and how to monitor and control risks.
Project purpose or justification (merit and expected results)
The Agricultural Competiveness Programme(ACP), though the current organization overseeing the project to implement the Global GAP standard project is not at a mature level in handling projects and so does not operate within the project management framework. The current project had an issue date of January 2013 and project close out was set for December 31, 2016. At this stage of the project, the mapping of the Agro Park is critical to completing the project. The GIS mapping of the Park will allow for auditing and ultimately Global GAP certification. The new project close out date is March 2018 with auditing scheduled for October 2017. The development of the project management plan is critical to meeting the timeline. The plan would contain all the subsidiary plans broken down into work packages where resources can be applied. The documentation of what needs to be done, when, by who and the money needed would provide the framework in which to work to achieve success.
Description of Product or Service to be generated by the Project – Project final deliverables
The project final deliverables will be: 1. Project charter 2. Scope management plan with work breakdown structure. 3. Cost management plan 4. Schedule management plan to include the schedule 5. Quality management plan including quality metrics 6. Risk management plan to include the risk register

Assumptions
It is assumed that assignments will be completed for submission on time. It is assumed that the Roxanne Myers-Gayle will approve the final graduation seminar. It is assumed that the final graduation project will be developed and that all corrective actions proposed by the tutor will be completed.It is assumed that the Agricultural Competitiveness Programme (ACP)in conjunction with the Inter-America Development Bank (IDB)will facilitate and fund the project. It is assumed that Roxanne Myers-Gayle, GlobalGAP Implementing Officer will be the lead on the project. It is assumed that all relevant information needed for the project will be provided by ACP.
Constraints
The knowledge base of the lead garnered during the Masters in Project Management is adequate to carry out the development of the project. The completion of the project to develop project management plan for GIS mapping of the Ebony Park Agro Park will have to comply with the end date of November 17,

2017 to facilitate submission for review and approval.
Preliminary risks
The preliminary risk is that the plan may be developed by team members with little or no project management knowledge, not cover all relevant knowledge areas and process groups which could result in the plan not being approved.
Budget
There is an estimated cost of 2.930 million Jamaican dollars (JD) to develop the project over three months. This icludes paying the Project Manager to develop the plan, consulting fees for the GIS Consultant, hold meetings and purchasing project management software.

Milestones and dates	Start date	End date
Project Charter and WBS submission	June 26, 2017	July 2, 2017
Chapter 1 and schedule	July 3 2017	July 9, 2017
Chapter 2 and adjustment to chapter 1 submission	July 10, 2017	July 16,2017
Chapter 3 and adjustment to chapter 2 submission	July 17, 2017	July 23, 2017
Signed charter, Bibliography	July 24, 2017	July 31, 2017
Scope management plan submission	August 28, 2017	September 8, 2017
Cost management plan submission	September 11, 2017	September 22, 2017
Schedule management plan submission	September 25, 2017	October 6, 2017
Quality management plan submissiobn	October 09, 2017	October 20, 2017
Risk management plan submission	October 23, 2017	November 3, 2017
Adjustment of project management plan	November 5, 2017	November 10, ,2017
Project Management Plan Submission	November13, 2017	November 17, 2017

Relevant historical information
Agricultural competitiveness formerly Rural Agricultural competitiveness programme was given funding in 2010 by the Inter-America Development Bank IDB to lauch a project to improve the competitiveness of Jamaica; Agricultural Sector by improving infrastructure and developing food safety and quality management systems to be able to access international, regional and national markets. The ACP operates in a project environment however, the project management maturity and capability of the entity is not at the level required level as all project development activities and outcomes are approved by the

funding agency, IDB. This is because the ACP and project coordination unit in MICAF operate within a functional organization and as such have no autonomy.
Stakeholders
Direct stakeholders: University for international Cooperation Tutor Examiner Reviewers Sponsoring Bank (IDB) Project Coordination Unit,(MICAF) Director ACPProgramme Director ACP Chief Financial Officer ACP Component Coordinator ACP Compliance Manager AIC Roxanne Myers-Gayle Indirect stakeholders: Family members of Roxanne Myers-Gayle Park Manager, Ebony Park Farmers

Project Manager: Roxanne Myers-Gayle	**Signature:** 
Authorized by:	**Signature:**

Figure 13. FGP Charter. (Source: UCI, 2017).

Appendix 2. FGP WBS.

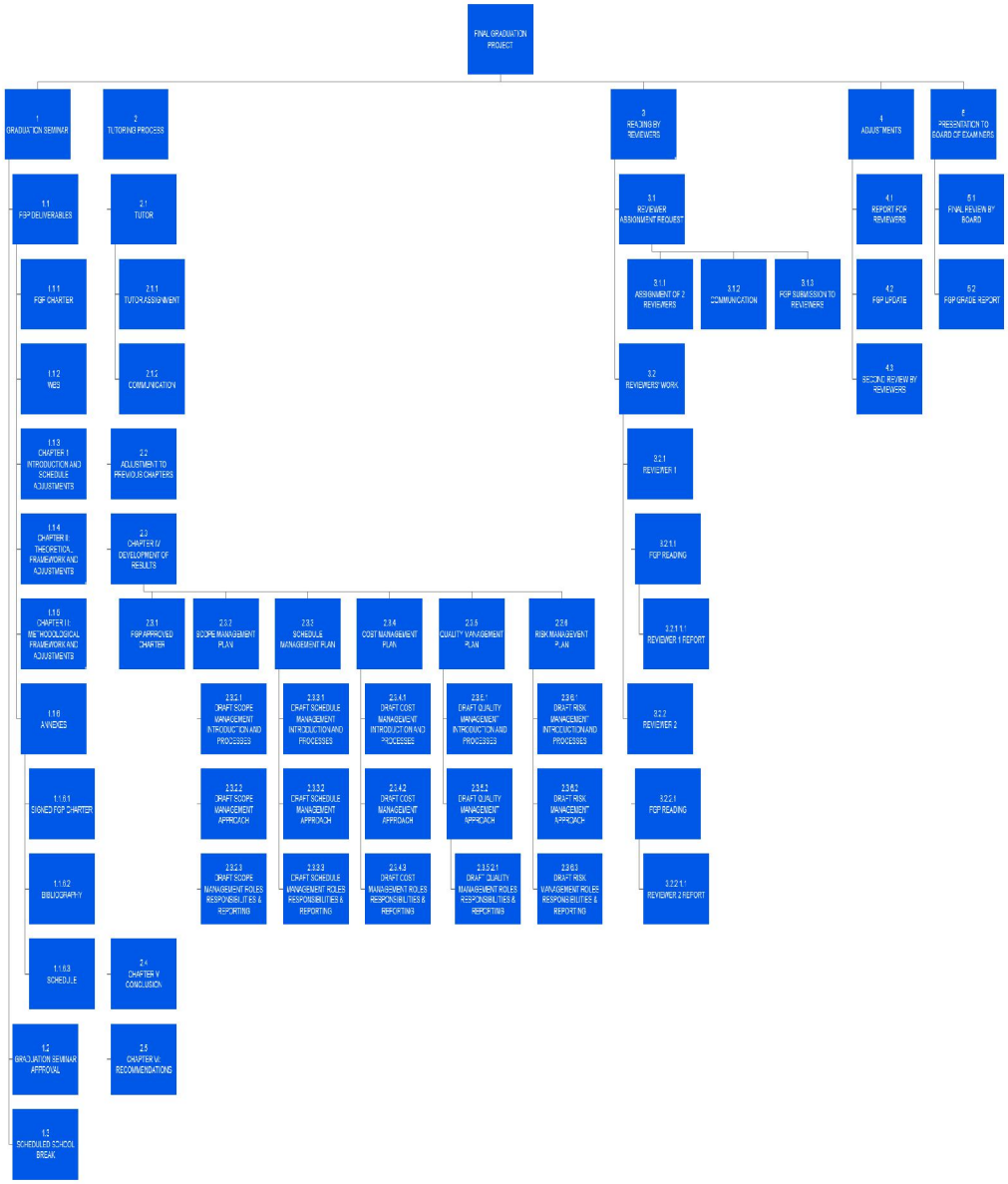


Figure 14. FGP WBS.

Appendix 3. GISMEPA Project. WBS Dictionary.

Chart 9. GISMEPA Project. WBS Dictionary.

Level	WBS ID	Element Name	Work Description	Deliverables	Budget	Resources
1	1.1	DRAFT TOR FOR GIS CONSULTANT	C2C prepares the Terms of Reference (TOR) for the GIS Consultant (GISC). This TOR will constitute the requirement documentation for the GISMEPA Project.	TOR	-	Computer Paper C2C
1	1.1.1	SUBMIT TOR FOR IDB APPROVAL	Prg. Mgr. submits completed TOR to the Project Sponsor for approval	-	$1000	Prg Mgr Computer Bearer
1	1.1.1.1	ADVERTISE JOB	The Component 2 Co-ordinator (C2C) will advertise the consultancy within MICAF, NIC, and AIC and the general public (in Newspaper). This advertisement should run for one (1) week.	-	$1000	Computer Internet C2C

1	1.2	CONDUCT INTERVIEWS	Once the job has been advertised and candidates are selected based on qualification and experience, the Programme Manager(Prg. Mgr.), Project Manager (PM)and the Compliance Manager (CM)will conduct a three panel interview	Recruited GIS Consultant	-	Prg. Mgr PM CM
1	1.3	PREPARE CONTRACT	Once the GIS Consultant has been selected, A contract will be drafted by the C2C and escalated to the Project Sponsor for approval by the Prg. Mgr.	-	-	C2C Prg. Mgr. Computer Paper Internet
2	1.3.1	SIGN CONTRACT	Once the terms of the contract have been explained to the selected candidate and are accepted, it should be signed by the GIS Consultant, the Programme Manager and the Sponsor.	Signed Contract	$1.75M	Paper Pen Prg. Mgr Spronsor
2	2.1	RETRIEVE AVAILABLE GIS INFORMATION FOR EBONY PARK	The GIS Consultant will research and retrieve (if available) maps and/or GPS data from relevant departments of MICAF or Inter-related organization (NIC, AIC, National Land Agency-NLA).	Base Map GPS data	-	NIC AIC NLA GISC

2	2.1.1	SITE VISIT	The GIS Consultant will make initial site visits with the Project Manager to verify the maps and/or GPS data with what currently exists on Ebony Park. A report should then be submitted to the Project Manager. This report should include a list of the farmer's plot, roads, structures and irrigation works that are on the Agro Park.	InitialSite Visit Report Containing checkist	-	GISC
2	2.1.1.1	PRE-MAPPING OF AGRO PARK	An initial mapping of the Agro Park should be conducted by the GIS Consultant using his /her own calibrated equipment. This mapping should be against GPS data that exist or from scratch if none exist.	Initial GPS Data	-	GISC
2	2.1.1.1.1	ADJUSTMENTS	The GIS Consultant should make changes to GPS data.	Adjusted GPS Data	-	GISC
2	2.2	VERIFY MAPPING DATA	The GIS Consultant, Project Manager and Compliance Manager should conduct a site visit to do a final mapping exercise to verify that the GPS data for all plots, structure, road and irrigation works are captured	Verified GPS Data	-	GISC
3	3.1	PRODUCE TRIAL MAPS	The GIS Consultant should produce three trial maps at a scale of 1:15000.	Three Trial Maps	-	GISC

	3.1.1	TRIAL MAP 1 AND INITIAL INSPECTION	The GIS Consultant should print an initial map (Trial map 1) at a scale of 1:15000 and This map should be inspected by the Compliance Manager, Project Manager and the MICAF QC Personnel using the requirements set out in the requirements documentation. A report should be prepared by the GIS Consultant to include all corrections to be applied to Trial Map 1 and any GPS data to be included.	Trial Map 1 Inspection Report	-	GISC CM PM MICAF QC
3	3.1.1.1	TRIAL MAP 2 AND FOLLOW-UP INSPECTION	The GIS Consultant should print a second map (Trial map 2) at a scale of 1:15000 using updated GPS data This map should be inspected by the Compliance Manager, Project Manager and the MICAF QC Personnel using the requirements set out in the requirements documentation. A report should be prepared by the GIS Consultant to include all corrections to be applied to Trial Map 2 and any GPS data to be included.	Trial Map 2 Inspection Report	-	GISC CM PM MICAF QC
3	3.1.1.1.1	TRIAL MAP 3 AND FINAL INSPECTION	The GIS Consultant should print an third map (Trial map 3) at a scale of 1:15000 using any updated GPS data. This map should be inspected by the Compliance Manager, Project Manager and the MICAF QC Personnel using the requirements set out in the requirements documentation. A report should be prepared by the GIS Consultant to include all corrections to be applied to Trial Map 3 and any GPS data to be included.	Trial Map 2 Inspection Report	-	GISC CM PM MICAF QC

4	4.1.1	MOCK AUDIT 1 USING ADJUSTED TRIAL MAP 1	The Project Manager and the Compliance Manager should conduct a mock audit using a checklist (prepared by the GIS Consultant) consisting of the list of farmers' plot, structures, roads and irrigation works and the adjusted Trial Map 1. A report containing the result of the audit should be prepared by the Compliance Manager and submit to the Project Manager	Initial Mock Audit Report	-	CM PM
4	4.1.1.1	FOLOW-UP MOCK AUDIT USING ADJUSTED TRIAL MAP 2	The Project Manager and the Compliance Manager should conduct a second mock audit using a checklist (prepared by the GIS Consultant) consisting of the list of farmers plot, structures, roads and irrigation works and the adjustedTrial Map 2. A report containing the result of the audit should be prepared by the Compliance Manager and submit to the Project Manager	Follow-up Audit Report		CM PM
4	4.1.1.1.1	FINAL MOCK AUDIT USING ADJUSTED TRIAL MAP 3	The Project Manager and the Compliance Manager should conduct a final mock audit using a checklist (prepared by the GIS Consultant) consisting of the list of farmers plot, structures, roads and irrigation works and the adjusted Trial Map 3. A report containing the result of the audit should be prepared by the Compliance Manager and submit to the Project Manager	Final Mock Audit Report	-	CM PM

5	5	PRESENT MAPS TO PROJECT SPONSOR	The adjusted Trial Map 3 consisting of all corrections should be submitted in printed and digital form by the GIS Consultant to the Project Manager. The Project Manager and the Programme Manager should meet with the GIS Consultant for explanation and sign off on the parameters.	Final Printed and Digital Maps Project Deliverable Acceptance Form		Prg Mgr PM Sponsor
5	5.1	FINAL APPROVAL OF MAPS	The Project Sponsor approves the maps provided any queries that may arise and resolved.	Approved Printed and Digital Maps		Sponsor

Appendix 4. GISMEPA Project Requirements Traceability Matrix.

Chart 17. GISMEPA Project Requirements Traceability Matrix.

GISMEPA PROJECT REQUIREMENTS TRACEABILITY MATRIX							
PROJECT NAME:		GISMEPA PROJECT	**Project Description:** Mapping of the Ebony Park Agro Park to create complete maps to be used in the certification of the Park in the GlobalGAP Version 5 Standard.				
PROJECT MANAGER NAME:		ROXANNE MYERS-GAYLE					
ID	***WBS ID***	***Technical and/or Customer Needs***	***Functional Requirement***	***Status***	**Implemented In**	**Verification**	**Additional Comments**
5	1.3.1	Signed GIS Consultant Contract	Bachelor's Degree FiveYears Experiece in Land Surveying Able to conduct mapping Able to create digital maps of scale 1:15000 Able to complete terms of contract within 60 days of Project kick-off.	Not Started			
12	2.2	Verified Mapping(GPS) Data	JAD 2001Map Projections	Not Started			
14	3.1.1.1.1	Inspected Trial Maps	JAD 2001 Map Projections	Not Started			
19	4.1.1.1.1	Final Mock Audit Report	Map is able to assist in locating farmers' plots, structure, roads, irrigation works.	Not Started			
21	5.1	Complete Printed and Digital Maps	JAD Map Projections 6 Printed Maps Digital Maps (done in AutoCad).	Not Started			

Appendix 5. FGP Schedule.

FINAL GRADUATION PROJECT	**6/26/2017**	**11/17/2017**
1 GRADUATION SEMINAR	**6/26/2017**	**8/15/2017**
1.1 FGP DELIVERABLES	6/26/2017	8/5/2017
1.1.1 FGP CHARTER	6/26/2017	7/2/2017
1.1.2 WBS	7/3/2017	7/9/2017
1.1.3 CHAPTER 1 INTRODUCTION AND SCHEDULE ADJUSTMENTS	7/10/2017	7/15/2017
1.1.4 CHAPTER II: THEORETICAL FRAMEWORK AND ADJUSTMENTS	7/16/2017	7/21/2017
1.1.5 CHAPTER III: METHODOLOGICAL FRAMEWORK AND ADJUSTMENTS	7/22/2017	7/28/2017
1.1.6 ANNEXES	7/30/2017	8/5/2017
1.1.6.1 SIGNED FGP CHARTER	7/30/2017	8/1/2017
1.1.6.2 BIBLIOGRAPHY	8/2/2017	8/3/2017
1.1.6.3 SCHEDULE	8/4/2017	8/5/2017
1.2 GRADUATION SEMINAR APPROVAL	8/6/2017	8/11/2017
1.3 SCHEDULED SCHOOL BREAK	8/12/2017	8/15/2017
2 TUTORING PROCESS	**8/16/2017**	**10/5/2017**
2.1 TUTOR	8/16/2017	8/21/2017
2.1.1 TUTOR ASSIGNMENT	8/16/2017	8/16/2017
2.1.2 COMMUNICATION	8/17/2017	8/21/2017
2.2 ADJUSTMENT TO PREVIOUS CHAPTERS	8/22/2017	8/26/2017
2.3 CHAPTER IV DEVELOPMENT OF RESULTS	8/27/2017	10/2/2017
2.3.1 FGP APPROVED CHARTER	8/27/2017	8/31/2017
2.3.2 SCOPE MANAGEMENT PLAN	8/31/2017	9/13/2017
2.3.2.1 DRAFT SCOPE MANAGEMENT INTRODUCTION AND PROCESSES	8/31/2017	9/6/2017
2.3.2.2 DRAFT SCOPE MANAGEMENT APPROACH	9/1/2017	9/6/2017
2.3.2.3 DRAFT SCOPE MANAGEMENT ROLES RESPONSIBILITIES & REPORTING	9/7/2017	9/13/2017
2.3.3 SCHEDULE MANAGEMENT PLAN	9/7/2017	9/13/2017
2.3.3.1 DRAFT SCHEDULE MANAGEMENT INTRODUCTION AND PROCESSES	9/7/2017	9/13/2017
2.3.3.2 DRAFT SCHEDULE MANAGEMENT APPROACH	9/7/2017	9/13/2017
2.3.3.3 DRAFT SCHEDULE MANAGEMENT ROLES RESPONSIBILITIES & REPORTING	9/7/2017	9/13/2017
2.3.4 COST MANAGEMENT PLAN	9/14/2017	9/19/2017
2.3.4.1 DRAFT COST MANAGEMENT INTRODUCTION AND PROCESSES	9/14/2017	9/19/2017
2.3.4.2 DRAFT COST MANAGEMENT APPROACH	9/14/2017	9/19/2017
2.3.4.3 DRAFT COST MANAGEMENT ROLES RESPONSIBILITIES & REPORTING	9/14/2017	9/19/2017
2.3.5 QUALITY MANAGEMENT PLAN	9/20/2017	9/25/2017
2.3.5.1 DRAFT QUALITY MANAGEMENT INTRODUCTION AND PROCESSES	9/20/2017	9/25/2017
2.3.5.2 DRAFT QUALITY MANAGEMENT APPROACH	9/20/2017	9/25/2017
2.3.5.2.1 DRAFT QUALITY MANAGEMENT ROLES RESPONSIBILITIES & REPORTING	9/20/2017	9/25/2017
2.3.6 RISK MANAGEMENT PLAN	9/26/2017	10/2/2017
2.3.6.1 DRAFT RISK MANAGEMENT INTRODUCTION AND PROCESSES	9/26/2017	10/2/2017
2.3.6.2 DRAFT RISK MANAGEMENT APPROACH	9/26/2017	10/2/2017
2.3.6.3 DRAFT RISK MANAGEMENT ROLES RESPONSIBILITIES & REPORTING	9/26/2017	10/2/2017
2.4 CHAPTER V: CONCLUSION	10/3/2017	10/5/2017
2.5 CHAPTER VI: RECOMMENDATIONS	10/6/2017	10/9/2017
3 READING BY REVIEWERS	**10/10/2017**	**11/3/2017**
3.1 REVIEWER ASSIGNMENT REQUEST	10/10/2017	10/24/2017
3.1.1 ASSIGNMENT OF 2 REVIEWERS	10/10/2017	10/14/2017
3.1.2 COMMUNICATION	10/15/2017	10/19/2017
3.1.3 FGP SUBMISSION TO REVIEWERS	10/20/2017	10/24/2017
3.2 REVIEWERS' WORK	10/25/2017	11/3/2017
3.2.1 REVIEWER 1	10/25/2017	10/29/2017
3.2.1.1 FGP READING	10/25/2017	10/29/2017
3.2.1.1.1 REVIEWER 1 REPORT	10/25/2017	10/29/2017
3.2.2 REVIEWER 2	10/30/2017	11/3/2017
3.2.2.1 FGP READING	10/30/2017	11/3/2017
3.2.2.1.1 REVIEWER 2 REPORT	10/30/2017	11/3/2017
4 ADJUSTMENTS	**11/4/2017**	**11/11/2017**
4.1 REPORT FOR REVIEWERS	11/11/2017	11/11/2017
4.2 FGP UPDATE	11/4/2017	11/6/2017
4.3 SECOND REVIEW BY REVIEWERS	11/7/2017	11/8/2017
5 PRESENTATION TO BOARD OF EXAMINERS	**11/9/2017**	**11/17/2017**
5.1 FINAL REVIEW BY BOARD	11/9/2017	11/11/2017
5.2 FGP GRADE REPORT	11/12/2017	11/17/2017

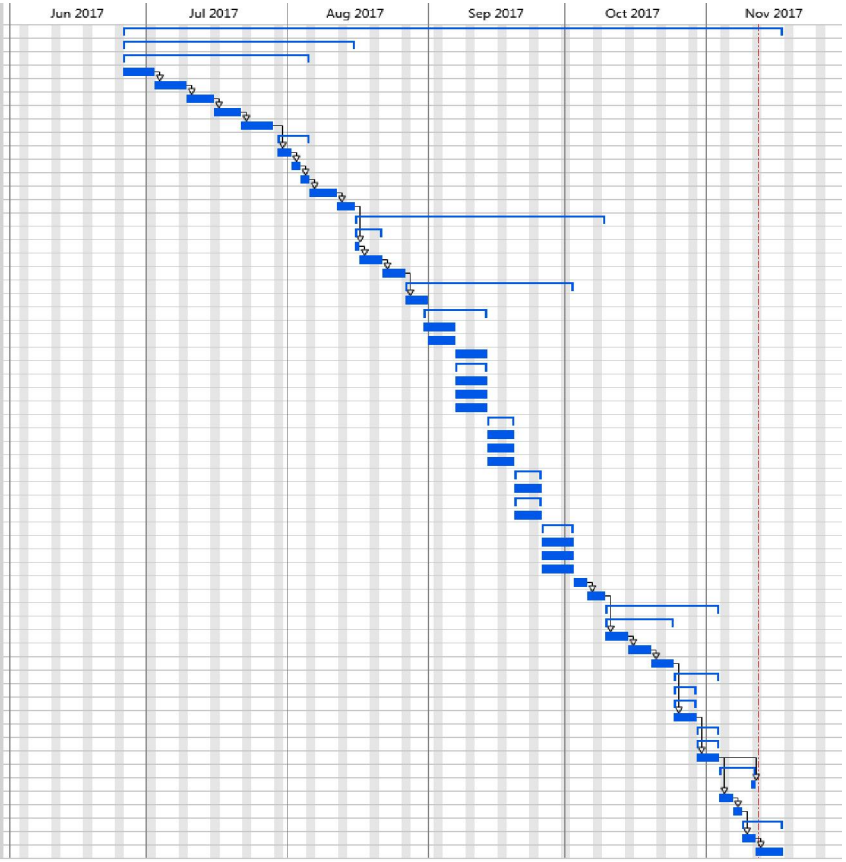


Figure 15. FGP Schedule.

Appendix 6. GISMEPA Project Schedule.

GISMEPA PROJECT	**12/11/2017**	**2/8/2018**
1 RECRUIT GIS CONSULTANT (Component 2 Coordinator)	**12/11/2017**	**1/2/2018**
1.1 DRAFT TOR FOR GIS CONSULTANT(Prg Manager)	12/11/2017	12/17/2017
1.1.1 SUBMIT TOR FOR IDB APPROVAL (Prg Manager)	12/11/2017	12/17/2017
1.1.1.1 ADVERTISE JOB (Component 2 Co-ordinator)	12/11/2017	12/17/2017
1.2 CONDUCT INTERVIEWS (Prg Manager PM and Component 2 Co-ordinator)	12/19/2017	12/19/2017
1.3 PREPARE CONTRACT (Prg Manager	12/25/2017	1/2/2018
1.3.1 SIGN CONTRACT (Prg. Manager, Sponsor)	1/2/2018	1/2/2018
1.3.2 CHRISTMAS AND NEW YEAR'S HOLIDAY	12/25/2017	1/1/2018
2 MAP AGRO PARK (GIS Consultant)	**1/2/2018**	**1/13/2018**
2.1 RETRIEVE AVAILABLE GIS INFORMATION FOR EBONY PARK (GIS Consultant)	1/2/2018	1/8/2018
2.1.1 SITE VISIT (GIS Consultant, PM)	1/2/2018	1/8/2018
2.1.1.1 PRE-MAPPING OF AGRO PARK (GIS Consultant)	1/2/2018	1/8/2018
2.1.1.1.1 ADJUSTMENTS (Compliance Manager, MICAF QC PM)	1/2/2018	1/8/2018
2.2 VERIFY MAPPING DATA (PM, Compliance Manager)	1/7/2018	1/13/2018
3 PRODUCE MAPS GIS Consultant)	**1/13/2018**	**1/26/2018**
3.1 PRODUCE TRIAL MAPS (GIS Consultant)	1/13/2018	1/26/2018
3.1.1 TRIAL MAP 1 AND INITIAL INSPECTION (GIS Consultant Compliance Manager MICAF QC)	1/13/2018	1/26/2018
3.1.1.1 TRIAL MAP 2 AND FOLLOW-UP INSPECTION (GIS Consultant, Compliance Manager and MICAF QC)	1/13/2018	1/26/2018
3.1.1.1.1 TRIAL MAP 3 AND FINAL INSPECTION (GIS Consultant Compliance Manager and MICAF QC)	1/13/2018	1/26/2018
4 ADJUSTMENTS (GIS Consultant)	**1/31/2018**	**2/6/2018**
4.1 MOCK AUDITS (PM, GIS Consultant)	1/31/2018	2/6/2018
4.1.1 MOCK AUDIT 1 USING ADJUSTED TRIAL MAP 1 (GIS Consultant, PM)	1/31/2018	2/6/2018
4.1.1.1 FOLOW-UP MOCK AUDIT USING ADJUSTED TRIAL MAP 2 (GIS Consultant, PM)	1/31/2018	2/6/2018
4.1.1.1.1 FINAL MOCK AUDIT USING ADJUSTED TRIAL MAP 3 (GIS Consultant, PM)	1/31/2018	2/6/2018
5 PRESENT MAPS TO PROJECT SPONSOR (Prg. Manager, PM)	**2/4/2018**	**2/8/2018**
5.1 FINAL APPROVAL OF MAPS(Project Sponsor)	2/4/2018	2/8/2018

Figure 16. GISMEPA Project Schedule.

Appendix 7. GISMEPA Activity Attribute.
Chart 18. GISMEPA Activity Attributes.

No.	WBS ID	ACTIVITY	ACTIVITY RESOURCE	ACTIVITY PREDECESSOR	PREDECESSOR SCHEDULING	PREDECESSO DEPENDENCY	ACTIVITY SUCCESSORS	SUCCESSOR SCHEDULING	SUCCESSOR DEPENDENCY	ACTIVITY ASSUMPTIONS	ACTIVITY CONSTRAINTS
01	1.1	DRAFT TOR FOR GIS CONSULTANT	C2M	-	-	-	02	12/11/2017	-	All requirements will be included.	-
02	1.1.1	SUBMIT TOR FOR IDB APPROVAL	PrgM	01	12/11/2017		03	12/17/2017	FS 01	TOR will be approved	1 week to get approval
03	1.1.1.1	ADVERTISE JOB	C2C	01,02	12/11/2017	FS 02	04	12/19/2017	FS02	Qualified persons will apply.	1 week to advertise
04	1.2	CONDUCT INTERVIEW	PrgM, C2M	03	12/11/2017	FS03	05	1/2/2018	FS03	Most qualified and experienced Consultant will be recruited.	1 week to conduct interview.
05	1.3	PREPARE CONTRACT	PrgM	04	12/19/2017	FS04	06	1/2/2018	FS04	All requirements will be included.	1 week to Prepare contract.
06	1.3.1	SIGN CONTRACT	PrgM, C2M	07	12/25/2017	FS05	07	12/25/2018	FS05	Consultant will agree with the terms of the contract	1 week to sign the contract.
07	1.3.2	CHRISTMAS AND NEW YEAR'S HOLIDAY	-	05	1/2/2018		06	1/13/2018	FS06	-	8 days break.Public Holiday.

08	2.1	RETRIEVE AVAILABLE GIS INFORMATION FOR EBONY PARK	GISC	06	12/25/2017	-	09	1/8/2018		There are base maps or parts thereof and/or GPS data	Unavailable base maps will result in delay. Start from scratch.
09	2.1.1	SITE VISIT	GISC	06	1/2/2018	SS06	10	1/8/2018	FS06 FS07	Site visit can be competed	Poor weather conditions or flooding
10	2.1.1.1	PRE-MAPPING OF AGRO PARK	GISC	09	1/2/2018	FS08	11	1/8/2018	-	Existing base maps or GPS data can be used to improve GPS data. GPS mapping equipment are calibrated and in good working conditions	Poor weather condition that could cause delay. Poor quality equipment
11	2.1.1.1.1	ADJUSTMENTS	GISC	10	1/2/2018	FS10	12	1/8/2018	FS08 FS09	Adjustments will be applied.	Delays due to adjustments not being adequately/appropriately applied.
12	2.2	VERIFY MAPPING DATA	GISC	10,11	1/2/2018	-	13	1/13/2018	FS11	Adjusted GPS mapping data is available.	Delays due to re-mapping.
13	3.1	PRODUCE TRIAL MAPS	GISC	-	1/2/2018	-	14	1/26/2018	-	Verified GPS data is available for map creation.	
14	3.1.1	TRIAL MAP 1 AND INITIAL INSPECTION	GISC	10, 11, 12	1/7/2018	FS 12	15	1/26/2018	FS10 FS11 FS12	Map will meet requirements	Additional adjustment will cause delay.
15	3.1.1.1	TRIAL MAP 2 AND FOLLOW-UP INSPECTION	CM	10, 11, 14	1/13/2018	FS14	16	1/26/2018	FS10 FS11 FS14	Map will meet requirements.	Additional adjustments will cause delays.
16	3.1.1.1.1	TRIAL MAP 3 AND FINAL INSPECTION	PM	10, 11, 15	1/13/2018	FS15	17	1/26/2018	FS14	Map will meet requirements.	Additional adjustments will cause

											delays.
17	4.1.1	MOCK AUDIT 1 USING ADJUSTED TRIAL MAP 1	MICA F QC	14	1/13/2018	FS14	18	1/26/2018	FS15	Audit result will meet requirements	Additional adjustments will cause delays
18	4.1.1.1	FOLOW-UP MOCK AUDIT USING ADJUSTED TRIAL MAP 2	GISC	15	1/13/2018	FS15	19	2/6/2018	FS15	Audit result will meet requirements	Additional adjustments will cause delays
19	4.1.1.1.1	FINAL MOCK AUDIT USING ADJUSTED TRIAL MAP 3	CM	16	1/13/2018	FS16	20	2/6/2018	FS19	Audit result will meet requirements	Additional adjustments will cause delays
20	5	PRESENT MAPS TO PROJECT SPONSOR	PM	17, 18, 19	1/31/2018	FS17 FS18 FS19	21	2/6/2018	FS20-	Map will meet requirements	-
21	5.1	FINAL APPROVAL OF MAPS	MICA F QC	20	1/31/2018	-	-	2/6/2018		Map will meet requirements	-

Appendix 8. FGP Milestone List.

Chart 7b. Milestones List for FGP schedule

WBS ID	Name	Date	Type		
1.	Project kick-off	June 26, 2017	Internal	Final	Mandatory
1.1.1	Project Charter submission	August 25, 2017	Internal	Interim	Mandatory
1.1.6.1	Adjustment to Project Charter	September 8, 2017	Internal	Final	Mandatory
2.3.2	Scope Management Plan submission	September 18, 2017	External	Final	Mandatory
2.3.3	Schedule Management Plan submission	September 28, 2017	Internal	Final	Mandatory
2.34	Cost Management Plan submission and adjustments	October 9, 2017	Internal	Final	Mandatory
2.3.5	Quality Management Plan submission and adjustments	October 17, 2017	Internal	Final	Mandatory
2.3.6	Risk Management Plan submission and	October 26, 2017	External	Final	Mandatory

	adjustments				
2.4	Conclusion	October 27,2017	Internal	Final	Mandatory
2.5	Recommendations	October 27, 2017	Internal	Final	Mandatory
3.	Review of Project Management Plan	November 03, 2017	External	Final	Mandatory
4.1	Adjustments to Project Management Plan	November 10, 2017	Internal	Final	Mandatory
5.1	Approval of Project Management Plan.	November 17, 2017	External	Final	Mandatory

Appendix 9: GISMEPA Quality Assurance and Quality control Logs

Chart 23. Quality Assurance Log.

Trial #	Date	Process Measured	Required Value	Actual Measured	Acceptable? (Y/N)	Recommendation	Date Resolved

Chart 24. Quality Control Log.

Trial #	Date	Process Measured	Required Value	Actual Measured	Acceptable? (Y/N)	Recommendation	Date Resolved

Appendix 10: Quality Inspection Register

Chart 27. GISMEPA Project Quality Inspection Register.

GIS MAPPING OF EBONY PARK AGRO PARK PROJECT, JAMAICA INSPECTION REGISTER							
CHECKLIST PREPARED BY:				DATE:			
CONTRACTOR:				DATE:			
PROJECT MANAGER REVIEW AND APPROVAL:				DATE:			
QUALITY ASSURANCE OFFICE REVIEW:				DATE:			
INITIAL INSPECTION	DATE	INSPECTION DONE BY	FOLLLOW-UP INSPECTION	DATE:	FINAL INSPECTION	DATE	COMMENT

Appendix 11. GISMEPA Project Risk Breakdown Structure.

Chart 28. GISMEPA Project Risk Breakdown Structure. (Source: David Hillson and Peter Simon – 2007).

RBS LEVEL 0	RBS LEVEL 1	RBS LEVEL 2
0.PROJECT RISK	1.TECHNICAL RISK	1.1 Scope definition
		1.2 Requirements definition
		1.3 Estimates, assumptions & constraints
		1.4 Technical processes
		1.5 Design
		1.6 Performance
	2. MANAGEMENT RISK	2.1Project Management
		2.2 Programme Management
		2.3 Operations management
		2.4 Organization
		2.5 Resourcing
		2.6 Communication
		2.7 Information
		2.8 Quality
	3.COMMERCIAL RISK	3.1Contractual terms & conditions
		3.2 Internal procurement
	4.EXTERNAL RISK	4.1 Legislation/Standard
		4.2 Site/facilities
		4.3 Environmental/weather
		4.4 Regulatory

PROBABILITY OF	VALUE	CATOSTRAPHIC	CRITICAL	MODERATE	MINOR	NEGLIGIBLE

Appendix 12. Probabaility-Impact Scales Matrix.

Chart 29. Probabaility-Impact Matrix.

OCCURRENCES		A	B	C	D	E
Frequently	5	5A	5B	5C	5D	5E
Likely	4	4A	4B	4C	4D	4E
Occasional	3	3A	3B	3C	3D	3E
Seldom	2	2A	2B	2C	2D	2E
Improbable	1	1A	1B	1C	1D	1E

Risk Levels:

- Risk is Very High for codes 5A, 5B, 5C,
- Risk is High for codes 4A, 4B, 4C, 3A
- Risk is Medium High for codes 5D, 5E, 4D, 3B, 3C, 2A, 2B
- Risk is Medium Low for codes 4D, 4E, 3D, 2C, 1A, 1B
- Risk is Low for codes 3E, 2D, 2E, 1C, 1D, 1E

Appendix 13. Project Deliverable Acceptance Form.

GIS MAPPING OF EBONY PARK AGRO PARK PROJECT,
JAMAICA
PROJECT DELIVERABLE ACCEPTANCE FORM

DATE:_____

ITEM/DELIVERABLE:_____
ITEM VERSION:_____
REVISION DATE:_____
GENERAL OBSERVATION:
_____
_____
_____
_____
_____

APPROVED ( ) **DENIED ( )**

VALIDATED BY:

_____ **DATE: _____**
PROJECT SPONSOR

SIGNED BY:

_____ **DATE:_____**
PROJECT MANAGER

Figure 20. Project Deliverable Acceptance Form.

Appendix 14. Change Request Form.

GIS MAPPING OF EBONY PARK AGRO PARK PROJECT, JAMAICA
CHANGE REQUEST FORM

DATE:_____

ACTIVITY/ITEM FOR CHANGE:_____

REQUEST SUBMITTED BY:_____

CHANGEREQUEST DETAILS:_____

_____

_____

APPROVED ( ) **DENIED ( )**

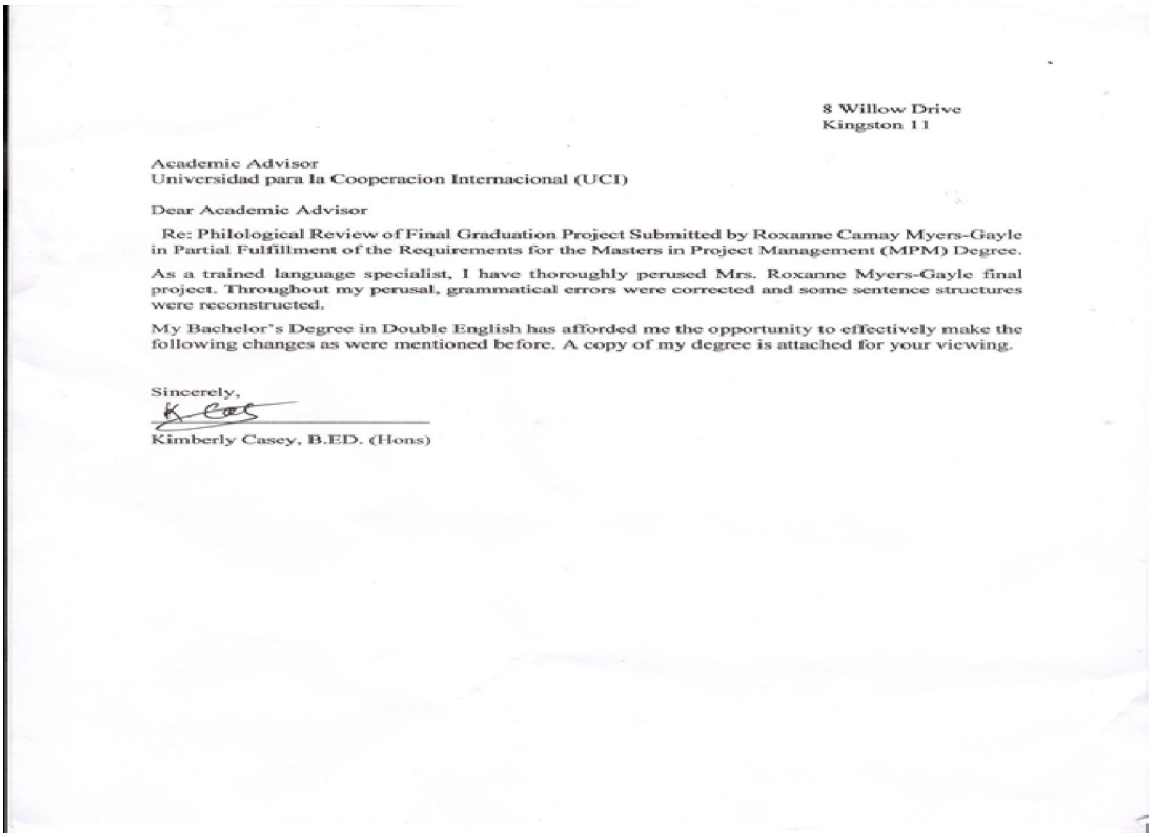
PREPARED BY:_____ **REVIEWED BY:** _____

APPROVED BY:_____
PROJECT SPONSOR

DATE: _____
DD/MM/YYYY

Figure 21. Project Change Request Form.

Appendix 15. Philological Dictum.



8 Willow Drive
Kingston 11

Academic Advisor
Universidad para la Cooperacion Internacional (UCI)

Dear Academic Advisor

Re: Philological Review of Final Graduation Project Submitted by Roxanne Camay Myers-Gayle in Partial Fulfillment of the Requirements for the Masters in Project Management (MPM) Degree.

As a trained language specialist, I have thoroughly perused Mrs. Roxanne Myers-Gayle final project. Throughout my perusal, grammatical errors were corrected and some sentence structures were reconstructed.

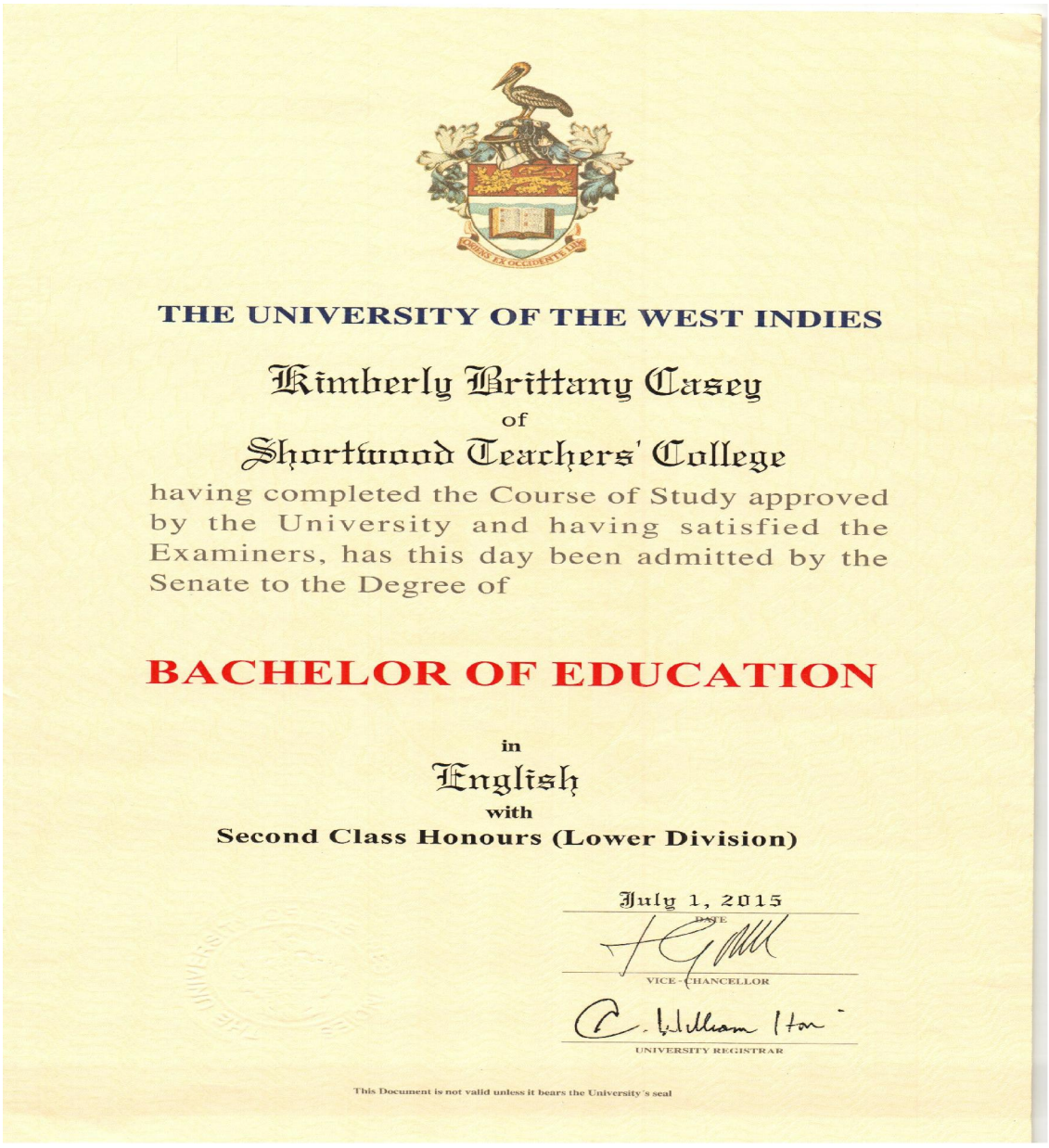
My Bachelor's Degree in Double English has afforded me the opportunity to effectively make the following changes as were mentioned before. A copy of my degree is attached for your viewing.

Sincerely,

Kimberly Casey, B.ED. (Hons)

Figure 22. Philological Dictum. (Source Kimberly Casey, Philologist, 2017).

Appendix 16. Philologist's Qualification.



THE UNIVERSITY OF THE WEST INDIES

Kimberly Brittany Casey

of

Shortwood Teachers' College

having completed the Course of Study approved by the University and having satisfied the Examiners, has this day been admitted by the Senate to the Degree of

BACHELOR OF EDUCATION

in

English

with

Second Class Honours (Lower Division)

July 1, 2015

DATE

VICE-CHANCELLOR

UNIVERSITY REGISTRAR

This Document is not valid unless it bears the University's seal

Figure 23. Philologist's Qualification(Source: Kimberly Casey, 2017).